U.S. SYSTEMS INTEGRATION STRATEGY

INPUT

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Hitachi
U.S. Systems Integration
Penetration Strategy

Final Report

Presented by

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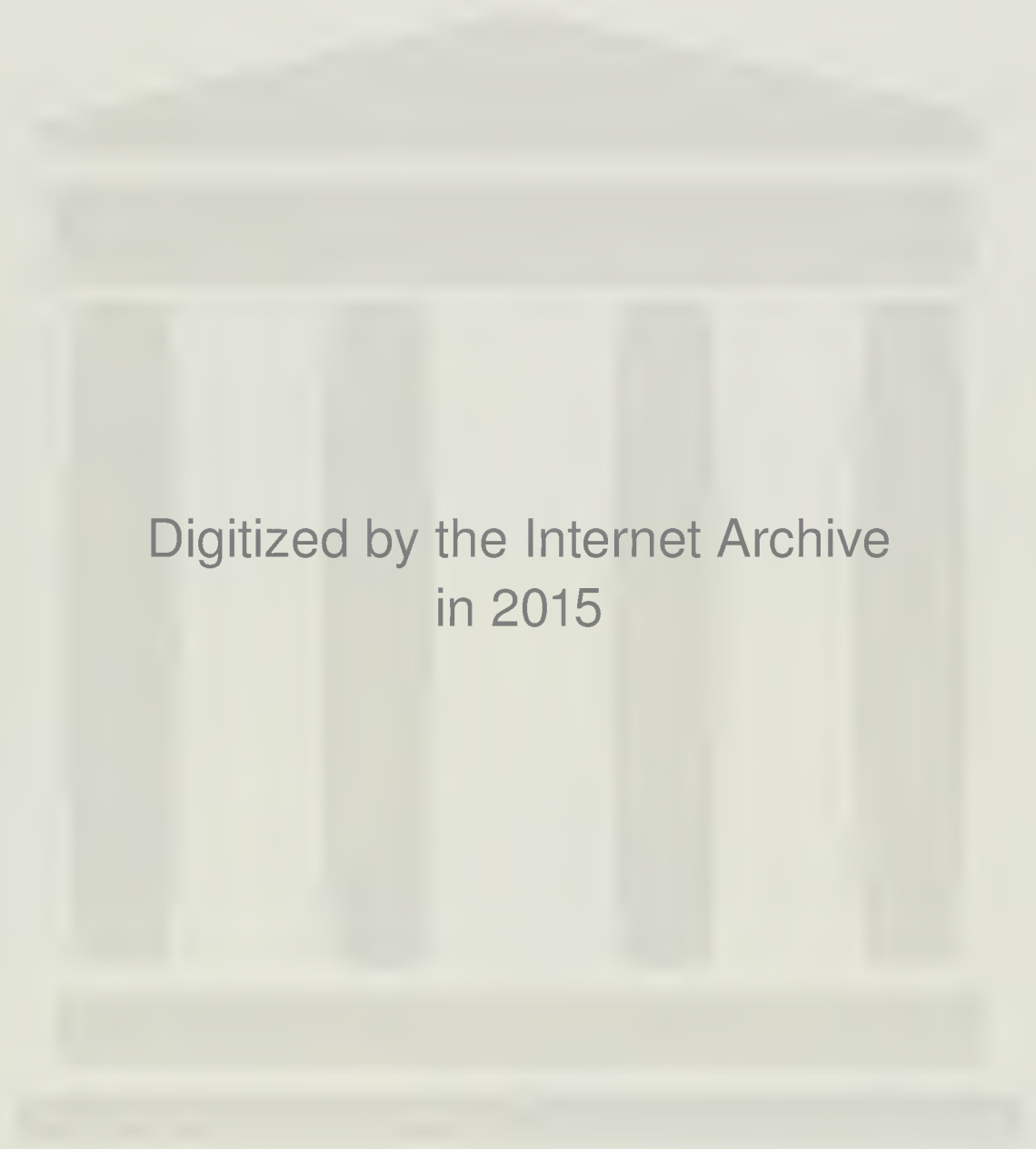

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Introduction

I. Introduction

A. Project Objective

- Define the requirements (infrastructure and fixed investment) of three alternate U.S. systems integration market penetration strategies

- Evaluate alternate strategies' advantages and disadvantages
- Identify and evaluate potential partners for the recommended strategy
- Be instructive on the nature of the U.S. systems integration business

B. Research Scope and Methodology

- Limited to U.S. systems integration market; emphasis on commercial rather than federal SI

- Emphasis on mainframe systems business (both PCM and UNIX)

- Assess the potential role of each of the three Hitachi U.S. operating units

- INPUT team of senior professionals—including Director of Custom Research and the Systems Integration Program Manager

- Use of SI program research data base plus vendor and third-party interviews

- Project coordination and reviews with Tim Meadows and staff; Bob Hesser of HDS

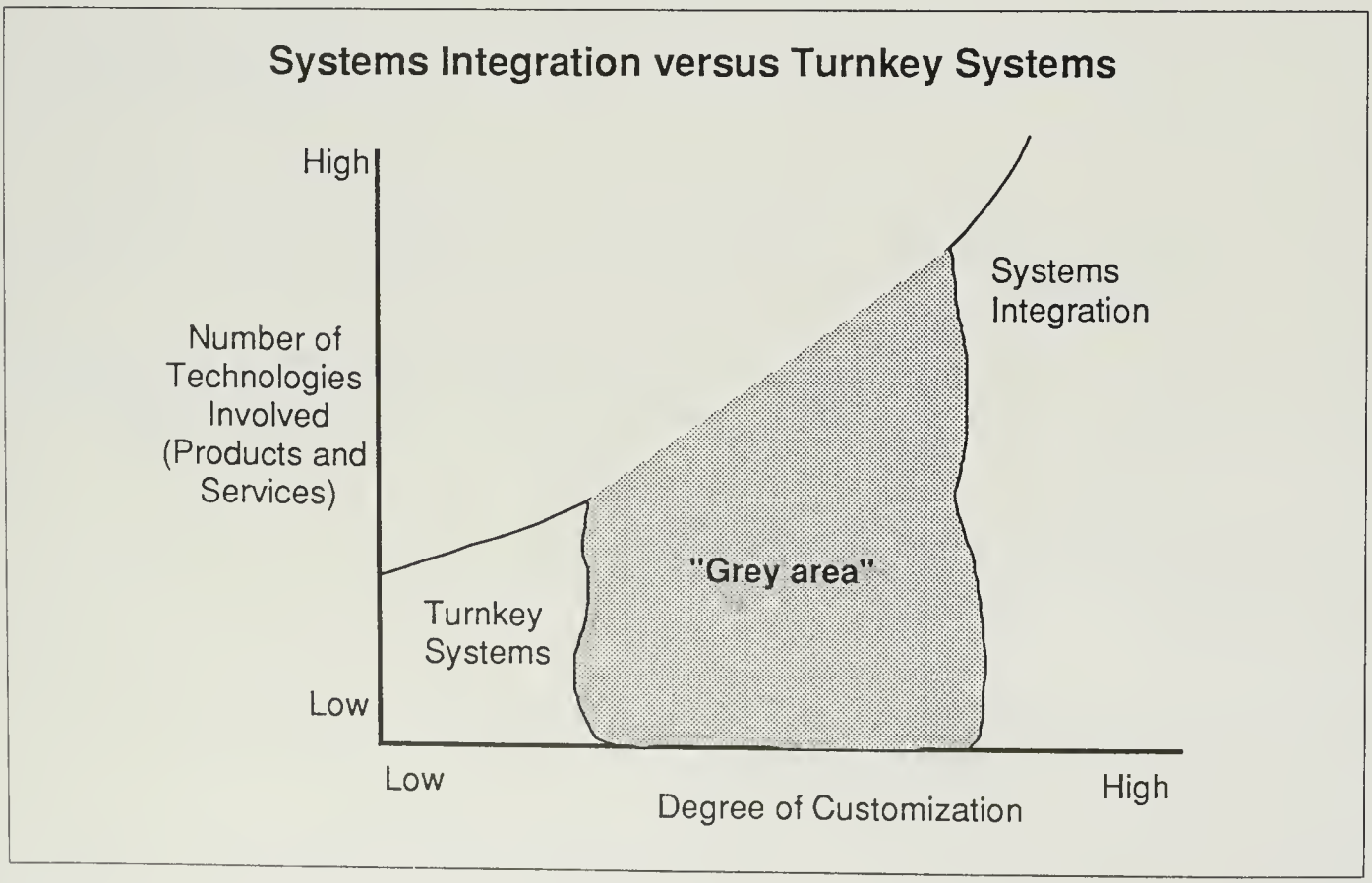
C. Key Definitions

1. Systems Integration ("SI")

A business offering that provides a complete solution to a complex information system, networking, or automation requirement through the custom selection and implementation of a variety of products and services, where information products and services exceed 50% of the contract value. The balance of contract value being specialized equipment (systems unique to the project such as warehouse conveyer systems, medical instrumentation, etc.). See Exhibit I-1

Note: Most SI projects are system replacements or enhancements, rather than new applications

EXHIBIT I-1



2. Systems Integrator

A business entity responsible for overall management of a system integration contract and the single point of contract and responsibility to the buyer for delivery of the specified system function and performance on schedule and at the contracted price.

A systems integrator will perform, or manage others who will perform, most or all of the following functions:

- Needs analysis
- Specification development
- Conceptual and detailed system design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, cut-over, test and evaluation
- Life cycle support including:
  - System documentation and user training
  - System operation/or management
  - System maintenance
- Financing
- Subcontractor management
- Program management

3. Types of SI Projects and System Integrators

Note: distinctions are not sharp; "grey areas" between them

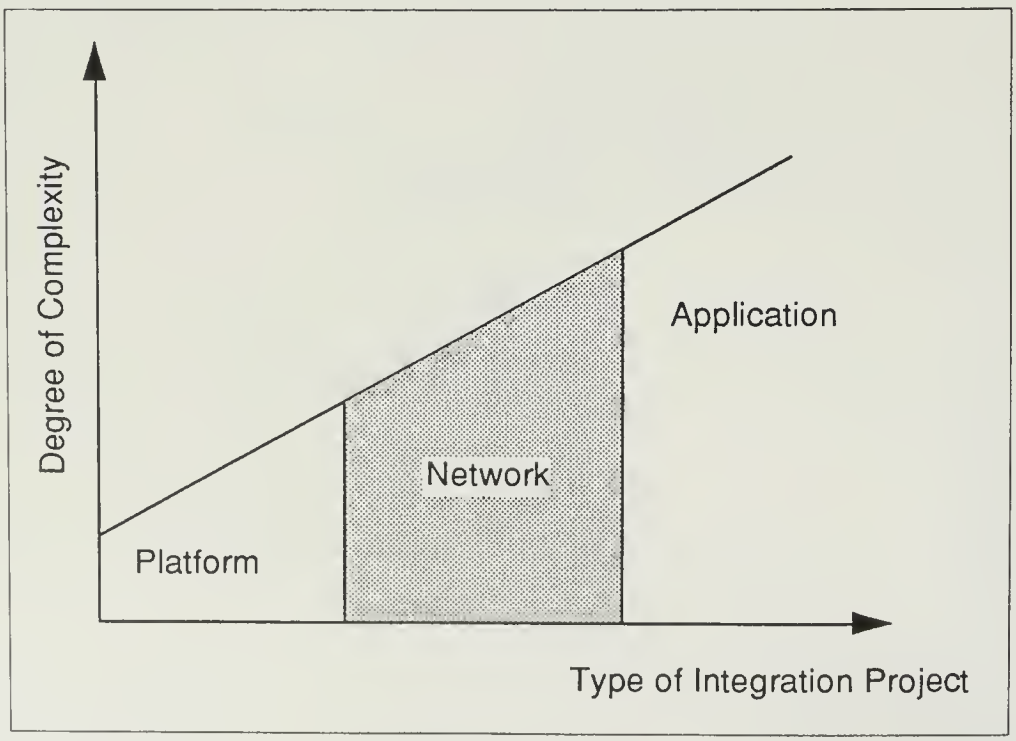
- Platform level: project emphasis and vendor skill is on hardware and operating system connectivity between specified elements of the solution

- Network level: project emphasis and vendor skill is in integrating dissimilar networks (WAN, LAN, host-to-host); may or may not include platform or application content

- Application level: project emphasis and vendor skill is on integrating applications; usually includes some platform and network integration content

Note: There is a growing technical and implementation complexity from platform to application-level integration.

EXHIBIT I-2



Examples of SI Projects

	Industry	Customer	System Integrator
Platform Projects	Medical	Humana, Inc.	Health Data Services
	Discrete Mfg.	USS/POSSCO Ind.	Computer Task Group
Network Projects	State Govt.	Confidential	AT&T
	State Agency	Confidential	Boeing Computer Services
Application Projects	Banking	Confidential	Systematics
	Process Mfg.	Confidential	DEC

Note: See appendixes G,H, and I for project profile examples

SI Capability Requirements

(H = High, M = Medium, L = Low)

Capability	SI Activity Level		
	Platform	Network	Application
Business Consulting	L	M	H
Design Methodology	L	L	H
Design/Integration/ Architecture	H	H	H
Project Management	H	H	H
Vertical Industry Experience	L	M	H
Application Expertise	L	L	H
Software Development	M	M	H
Education/Training/ Documentation	M	M	H
Packaged Applications Software	-	-	H
Packaged Systems Software	H	M	M
Standard Computer Hardware	H	M	M
Custom Computer Hardware	L	L	L
Communications Hardware	-	H	M
Service and Repair	H	H	L
Software Maintenance	L	L	M

Executive Overview

II. Executive Overview

A. U.S. Systems Integration Market, 1989-1994

1. Total market will grow to $17.1 billion in 1994 from a 1989 base of about $5.8 billion.

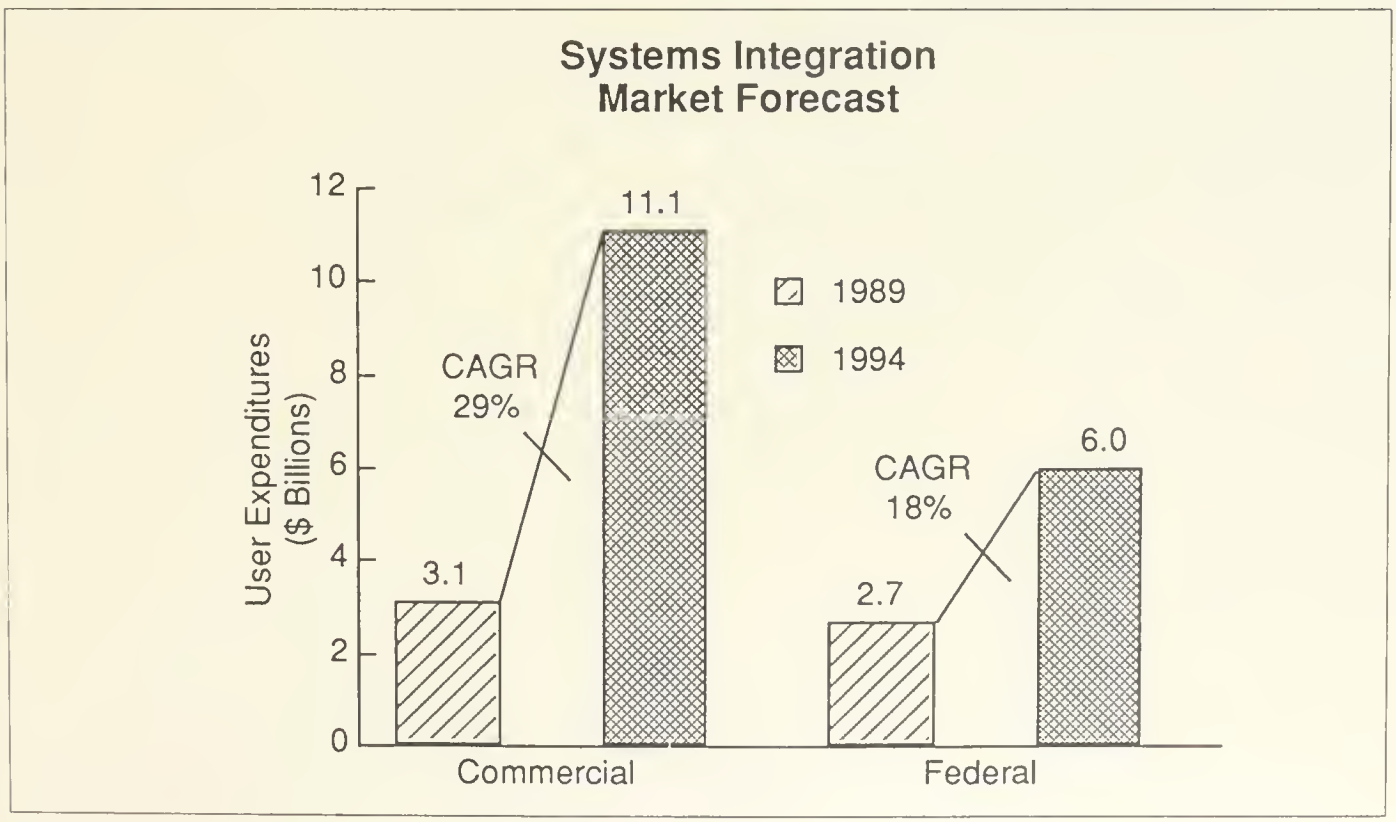
2. Compound annual growth rate (CAGR) of 24%, the fastest for any of the six major information services delivery modes

3. In total, systems integration accounted for about 6.2% of the 1989 industry revenue of $94.0 billion.

4. Will represent about 9% of 1994's $192.0 billion information services industry market

5. The commercial SI market is growing more rapidly than the federal market. See Exhibit II-1.

EXHIBIT II-1



A. U.S. Systems Integration Market, 1989-1994 (continued)

6. Federal (versus Commercial)

- Harder, longer sale
- Lower margins
- Threat of protest
- More risk sharing
- Japanese ownership not an advantage
- Low software leverage (unique applications)
- Megacontracts (many >$100 million)

7. Market Size by Project Type

• Platform	25%
• Network	15%
• Application	60%
Total SI Market	100%

B. Systems Integration Competitive Environment

	Examples
1. Equipment Manufacturers	Primary: IBM, DEC, Unisys Secondary: HP, Sun, Prime
2. Professional Services Firms	Andersen Consulting, EDS, Computer Task Group, Computer Sciences Corp., SHL Systemhouse
3. Telecommunications Companies	AT&T, NYNEX, Ameritech
4. Other/Aerospace	Bechtel, Boeing Computer Services, McDonnell Douglas Systems Integration

C. Role of UNIX Mainframes in U.S. Systems Integration Business (1989-1994)

1. Current Status of UNIX in the U.S.

a. Strong user support due to advantages:

- Portability ("takes hardware out of the decision")
- Scalability (micro to supercomputer)
- Standard environment for developers
- Communication capabilities
- Lower-cost storage and peripherals
- European commitment to UNIX

b. Federal government support (largest single user)

c. Majority of UNIX activity is:

- On minis and workstations
- End-user-controlled
- Distributed application/"work group computing" (e.g., branch office automation, engineering design teams)
- Compute-intensive technical (80%) rather than commercial applications (20%)
- Without strong vertical market emphasis (leaders are government, telecom, finance, manufacturing)

d. Under public pressure, all major hardware vendor have announced UNIX support.

2. Mainframe UNIX Growth Obstacles:

   a. Lack of technical capability for "mainstream corporate data center" processing:

      - Strong RDBMS, e.g., DB2
      - Transaction processing subsystem, e.g., CICS
      - DASD bottleneck solutions (I/O bound)
      - Security
      - Support for record indexing and virtual memory
      - Not user friendly
      - Fault-tolerant/"nonstop" processing

   b. Hardware vendors (e.g., IBM, DEC) are not motivated to emphasize UNIX since it runs counter to their proprietary technology (e.g., IBM's SAA) and threatens account control. Only Amdahl has fully embraced UNIX, because it has nothing to lose!

   c. Controversy over standards (OSF versus UNIX International)

   d. Users have enormous investments in proprietary solutions.

   e. Users are uncertain about how to adopt "open systems" in their information systems planning.

3. INPUT Predictions (1989-1994)

a. Major standards controversy (UNIX versus OSF) will be resolved within two years.

b. The critical processes of change will be very slow:

- U.S. mainframe hardware vendors' real support for open systems will be at minimum pace. (only exception: Amdahl)

- Technology to support mainframe UNIX-based "mission-critical" corporate applications will initially come from third parties, e.g., Oracle, but these don't have enough muscle to bring all the pieces together rapidly.

- Users will not move aggressively into mainframe UNIX applications because of the:

  - Lack of application and operations support tools
  - Prior investment in proprietary solutions
  - Confusion and uncertainty in planning and implementation

c. UNIX growth will be in *new* applications that are relatively standalone and independent of other corporate information systems.

4. INPUT Conclusions on UNIX' Role in Systems Integration

a. UNIX will *not* be a significant factor in the U.S. systems integration market in the next five years (through 1994) because:

- SI projects emphasize the enhancement and integration of existing systems (not new ones).
- SI projects typically require robust data base and non-stop transaction processing capabilities.
- The role of UNIX imbedded in a proprietary mainframe system corporate environment is doubtful at this time.
- INPUT identified only four system integrators currently pursuing UNIX:
  - DMR, Inc.: $160 million Canadian professional services company with an Open Systems consulting group
  - Ameritech: 2 of 8 outstanding proposals are UNIX-based (all DEC VAX—no mainframes involved)
  - NYNEX: AGS group is working on an SAA-to-UNIX connection; no UNIX SI proposals or contracts
  - AT&T: primarily for distributed applications

b. The most likely fit for UNIX in the U.S. systems integration market is in work group oriented projects involving workstations, LANs, and servers.

4. INPUT Conclusions on UNIX' Role in Systems Integration (continued)

   c. Mainframe UNIX opportunities will be mostly limited to conversion services for data centers that decide to migrate to UNIX.

   d. There will also be a need for connecting data center mainframes (proprietary systems) with distributed UNIX work group systems, but this does not involve mainframe UNIX processors.

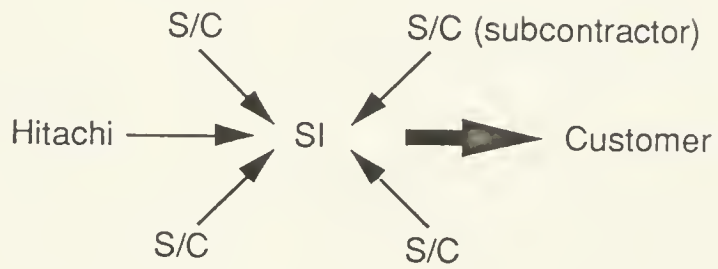
   e. Systems integration does, however, offer distribution channel opportunities for Hitachi's current PCM product line as discussed in the balance of this report.

D. Hitachi SI Strategy Options

1. Hitachi Strategy Scenarios

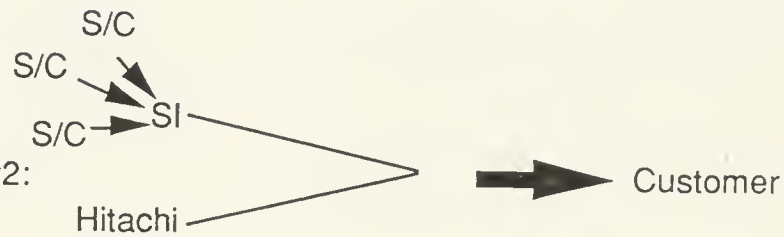
Subcontractor Role

Case #1:



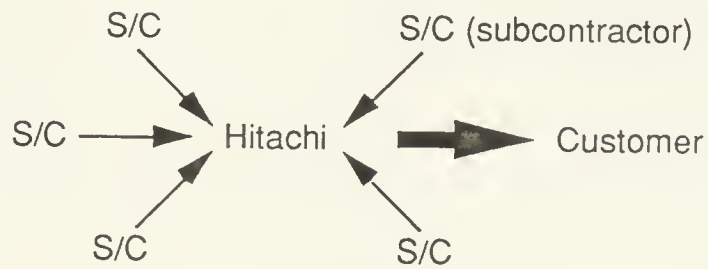
Team Sales and Risk Sharing Option

Case #2:



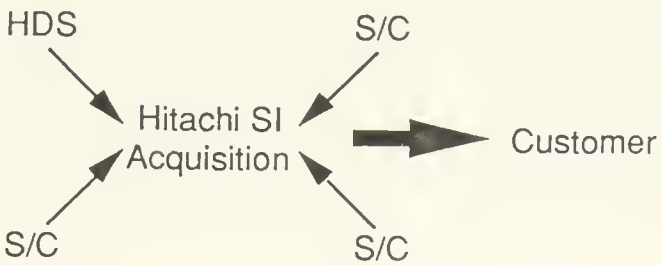
Platform Level Integrator

Case #3:



Application Level Integrator

Case #4:



2. Potential Hitachi U.S. Organization Leverage by Function

	Computer Products	Data Systems	Hitachi America
1. Sales and support	—	High	Low
2. Marketing	Low	High	Low
3. Customer support	—	High	—
4. Planning	High	High	Low
5. Finance and accounting	Low	Medium	Low
6. Contracting	—	Medium	—
7. Policies and procedures	—	Medium	—
8. Legal	—	High	Low
9. Project management	—	Low	—
10. Internal education/training	—	High	—
11. Systems operations	—	—	—
12. Programming/systems development	—	—	—
13. Application software	—	—	—
14. Vertical market expertise	—	Low	—
15. Networking technology	Medium	—	—

Conclusion: HDS offers the most leverage in supporting the infrastructure requirements of an organization to penetrate the SI market

3. Data on Strategy Options

Characteristic	Case #1 Subcontractor	Case #2 Team/Share Risks	Case #3 Platform Integrator	Case #4 Application Integrator
1. Sales focus	Sell Integrators	Sell Integrators	Leverage HDS sales force	Sell direct to customer
2. SI projects addressable	• Platform • Network • Application	• Platform • Network • Application	• Platform	• Application
3. Services offered	• PCM hardware • Installation • Maintenance • Hardware leasing	• PCM hardware • Installation • Maintenance • Hardware leasing • Project financing (lease back?)	• PCM and M660 hardware • Installation • Maintenance • Hardware leasing • Project financing (lease back?) • Project mgmt. • Training and education • Comm. software?	Depends on company acquired—could have vertical market emphasis
4. Fit with class of integrator	SIs are key • Hardware—none • Professional services—good • Telecommunications—good • Aerospace—limited	SIs are key • Hardware—none • Professional services—good • Telecommunications—good • Aerospace—good	Minor roles required • Hardware—none • Professional services—good, as sub • Telecommunications—good, as sub • Aerospace—good, as sub	All classes (except hardware) could be subs or bidding teammates
5. Infrastructure required	• Channel VP (1) • Sales (4) • Marketing (1) • Administration (1) Total people (7)	• Channel VP (1) • Sales (4) • Marketing (1) • Administration (4) • Technical (2) • Project mgmt (2) Total people (14)	• General mgr/VP (1) • Mkt. devel. (5) • Marketing (1) • Administration (7) • Technical (3) • Project mgmt. (2) • Training (1) Total people (20) • Tech demo center $1.8M • Promotion $.6M	• Comes with the acquisition • Diminished dependency on HDS
6. Two-year investment in fixed costs	$1.9 Million	$3.4 Million	$6.9 Million	$200-400 Million

4. Evaluation of Strategy Options

Strategy	Advantages	Disadvantages	INPUT Conclusions
Case #1: Subcontractor	1. Lowest financial risk 2. Lowest image exposure 3. Lowest investment	1. Least control over destiny 2. No end-user contact 3. Low value added (commodity business) 4. Deepest discounts/lowest profit levels 5. Slow and uncertain revenue development	**Simplest, low risk approach**
Case #2: Team Sales and Risk Sharing	1. Offers direct client contact 2. Leverages Hitachi's financial strength 3. SI market entry without need for major infrastructure investment	1. Little control over risk—must trust SI partners 2. Need for project financing is a small percent of total 3. Slow and uncertain revenue development	**Clever way to protect installed base and open door to broader SI market**
Case #3: Platform Integrator	1. Leverages and protects installed HDS base 2. Hitachi moves from commodity to value-added solution supplier 3. Least investment required to become full SI 4. Expansion foundation for niche networks and application integration efforts 5. Laboratory for advanced Hitachi solutions (new product requirements)	1. EDS likely to feel uncomfortable 2. Opportunity mostly limited to sites where Hitachi is already installed 3. Beyond #2 above, emphasis is on developing a market rather than serving one 4. Longer start-up time (12 months to critical mass)	**Lowest cost Full SI player**
Case #4: Application Integrator	1. Certain and significant revenue stream 2. Participates in full SI market growth 3. New internal channel for Hitachi products 4. Adds strong professional services capability 5. Strengthens account control	1. EDS likely to be very upset 2. Large financial investment required 3. Normal acquisition risks 4. "Hardware mindset" has been a problem for U.S. firms attempting service offerings	**Highest certainty of significant market share**

5. INPUT SI Strategy Recommendation

- Evaluation criteria:
  - Ease of implementation
  - Control over outcome
  - Positioning for the future
- Recommendation:
  - Case #3—become a platform-level integrator
  - Selectively pursue Case #1 and #2 in parallel with Case #3
- Rationale:
  - Cases #1 and #2 are without control
  - Case #3 Enhances HDS hardware business (become a solution provider)
  - Provides control over outcome without $200 to $400 million investment of Case #4
  - Doesn't preclude acquisition to enhance the offering
  - Could position offering to be compatible with EDS strategy and Hitachi Open Systems strategy (long-term)
  - Case #4 is likely to be difficult to implement and offers an inflexible future.

E. Partner Analysis and Recommendations

1. Observations on SI partnerships

- Most are temporary and serve tactical sales objectives
- Emphasis on quantity rather than quality
- Primary advantage is to get "preliminaries" out of the way to shorten bidding time if and when opportunities arise.
- Sometimes (often) nothing happens...
- Highly dynamic and rapidly changing set of vendor relationships

2. INPUT recommendation to Hitachi

- Take a more strategic, long-term approach to partner relationship
- Emphasize quality—target a maximum of two or three firms
- Partner selection criteria:
  - Fit with SI strategy #3
  - Willingness to cooperate
  - Reputation/competence
  - Industry power/influence
  - Potential Open Systems proponent

3. Overall SI Capabilities by Class of Integrator

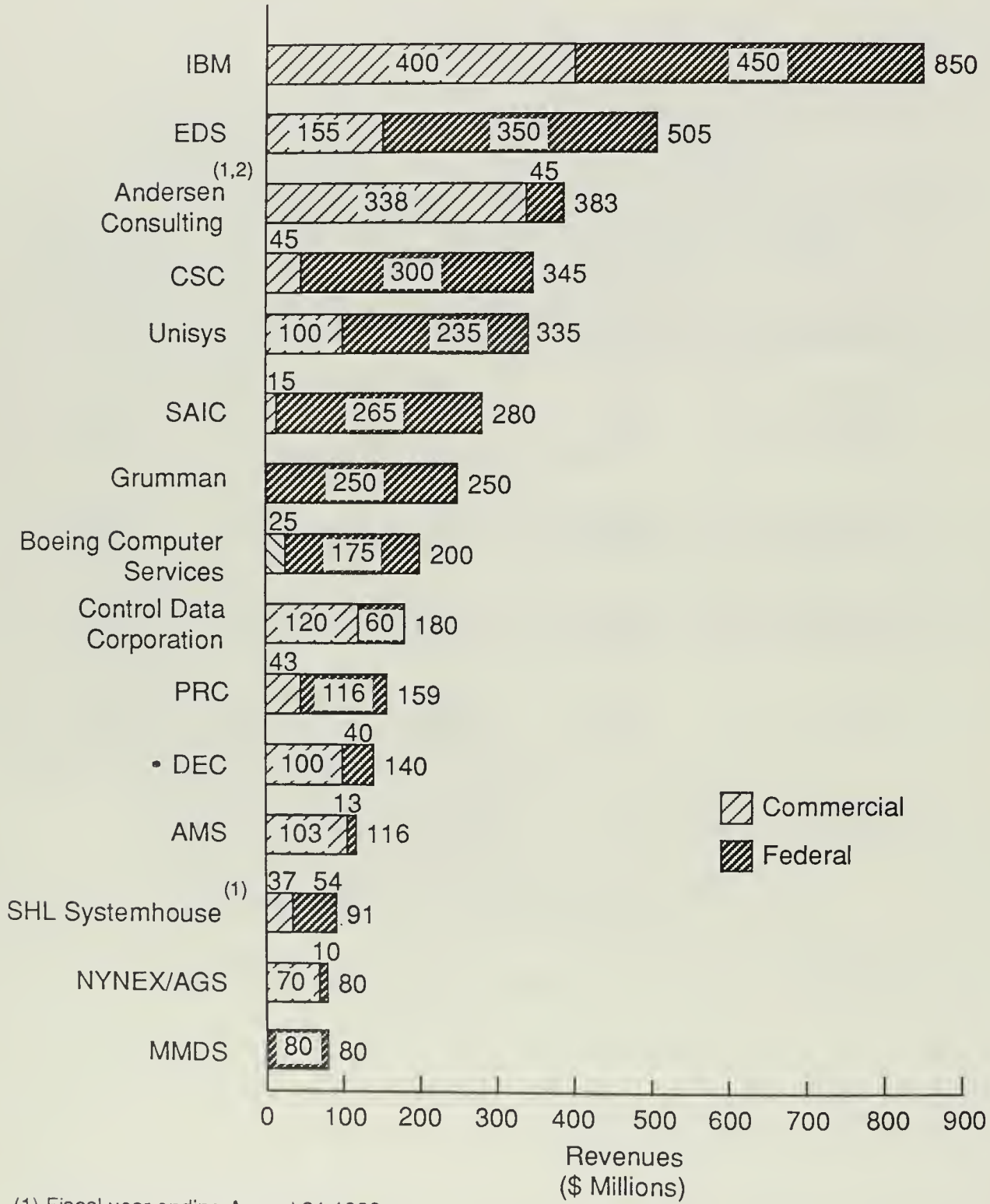
Capability or Skill	Hardware Manufacturers*	Professional Services Companies	Telecommuni-cations Companies	Aerospace Companies
Ability to manage risk	▨	▧	▧	▧
Project management skills	▨	▨	□	▧
Technology expertise	▨	▨	▧	▨
Vertical industry expertise	▧	▨	▧	▧
Client relationships	▧	▨	▧	▧

▨ High ▧ Medium □ Low

Conclusion: Target a Professional Services Partner

* Hardware manufacutrers are too competitive to be a valid option

4. Leading SI Vendors Ranked by 1988 Revenue



(1) Fiscal year ending August 31,1988
(2) Andersen revenues include no hardware pass through.

5. INPUT Partner Recommendations

- Six candidates were selected for analysis based on their fit with criteria and/or instructive value to Hitachi (NYNEX/ AGS). Detailed company profiles are in the appendixes.

- Oracle is added as an interesting emerging system integrator.

Analysis of Potential Partners for Case #3—Platform SI Strategy

Partner Criteria	EDS	Andersen Consulting	Computer Sciences	SHL[5]	NYNEX/ AGS	Oracle
Fit with platform SI strategy	Yes	Yes	Yes	Yes	Yes	Yes
Likelihood of cooperation	High	Medium	Medium	Medium	Low	High[1]
SI reputation/ competence	High	High	High	High	Medium	Medium[2]
SI industry power and influence	High	High	Medium	Low	Low	Low
Potential Open Systems support	Medium[4]	Medium[4]	Medium	Medium	Low	High[3]
Conclusions	Best	Good	Okay	Weakest	No	Very interesting

(1) Oracle is already interested in filling the UNIX software tools void
(2) Oracle is a new player in SI, but ranks high in its data base software field
(3) Oracle's business has been built on software portability and many IBM clients
(4) EDS and Andersen depend heavily on IBM customer base
(5) SHL is being offered for sale by investment bankers who have contacted Japanese companies (NEC)

INPUT Recommendation:

1. Open partnership discussion first with EDS.
   - Leverage 20% ownership position
   - Find common ground with EDS regarding SI as channel for HDS PCM and (longer term) UNIX mainframes
   - Determine fit of HDS platform SI strategy with EDS strategy
2. Open discussions with Oracle regarding filling the UNIX mainframe support systems software void; champion the cause!
3. Pull together as three-way partnership between EDS, Oracle, and Hitachi (HDS).

F. Summary INPUT Conclusions and Recommendations

1. Systems integration is a very complex and competitive business—success does not come easily.

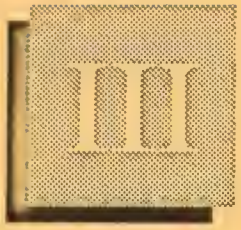
2. Long-term U.S. mainframe market forces make it necessary for vendors to become solution providers (e.g., SI) or seek channel relationships (e.g., SI) to remain viable.

3. Mainframe UNIX applications are unlikely to be a significant part of the U.S. SI market until after 1994—unless a strong champion emerges to provide the support tools and technology required (Hitachi?!)

4. INPUT recommends strongly that Hitachi participate in the SI channel in order to maintain market share.

5. INPUT specifically recommends that Hitachi:

   - Provide platform-level SI services for HDS's PCM products (Case #3)
   - Actively sell system integrators as a PCM subcontractor (Case #1) moving to teaming relationships (Case #2) in parallel with Case #3.
   - Offer SI project financing as a unique part of the package
   - Develop a technology-based long-term SI partnership with EDS and Oracle to promote both the PCM (short-term) and Open Systems business (long-term)—Champion the cause!
   - Offer conversion services to UNIX mainframe platforms (with follow-on system operations potential)



U.S. Systems Integration Market Evolution, 1989-1994

III. U.S. Systems Integration Market Evolution, 1989-1994

A. Total Market—Federal and Commercial

1. Total market go grow to $17.1 billion in 1994 from a 1989 base of about $5.8 billion.

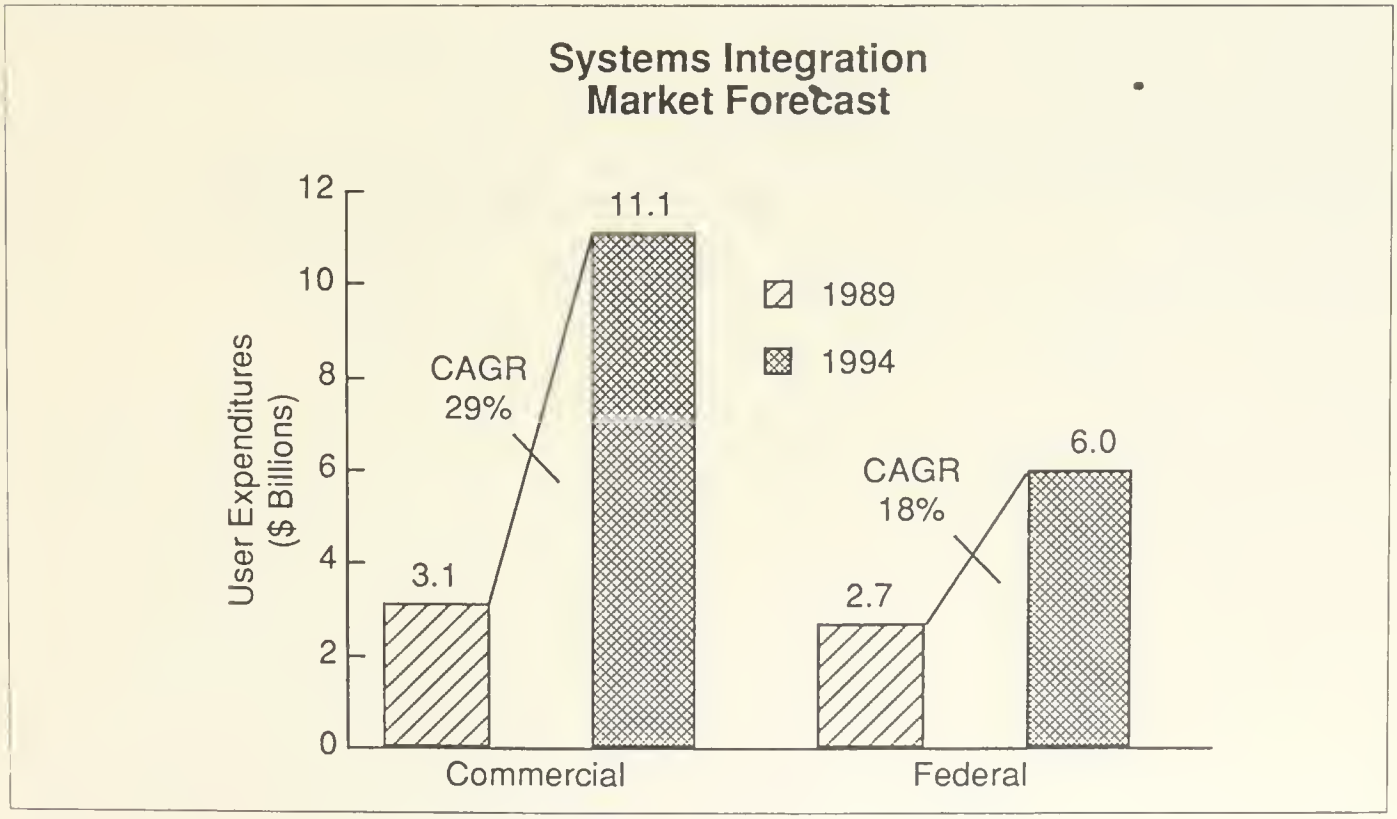
2. Compound annual growth rate (CAGR) of 24%, the fastest for any of the six major information services delivery modes

3. In total, systems integration accounted for about 6.2% of the 1989 industry revenue of $94.0 billion

4. Will represent about 9% of 1994's $192.0 billion information services industry market

5. The commercial SI market is growing more rapidly than the federal market. See Exhibit III-1.

EXHIBIT III-1



6. Federal (versus Commercial)

- Harder, longer sale
- Lower margins
- Threat of protest
- More risk sharing
- Japanese ownership not an advantage
- Low software leverage (strange applications)
- Megacontracts (many > $100 million)

B. SI Segment Evolution, 1990-1994

1. Hardware/Operating Systems (i.e., Platforms):

   - Some progress on standards (more in LANs than hosts, due to smaller installed base)

2. Software Products:

   - Increased solution packaging to reduce risks and gain efficiency

   - Increased multiplatform compatibility due to SAA and UNIX (in distributed environment)

3. Professional Services:

   - Tools/methodologies to reduce risk and gain productivity will increase

4. Other Services:

   - More SI contracts will include systems operations (S.O.)
   - SI contracts will lead to S.O.
   - Current trend is not strong

C. Trends by Type of SI Project

1. Platform projects (creation of a common processing architecture, e.g., consolidation, standardization projects):

   - Estimated 25% of current market
   - Third fastest growing
   - Prime target of equipment manufacturers

2. Network projects (integrate multiple networks, each usually application specific):

   - Estimated 15% of current market
   - Second fastest growing
   - Prime target of telecos

3. Application projects (creating and integrating new applications alone or with the other systems, networks, and platforms of the enterprise):

   - Estimated 60% of current SI market
   - Fastest growing
   - Prime target of professional services firms, but recognized as very important by equipment manufacturers and telecos who want to penetrate this market
   - Latters' strategy will be to target replicable solutions

D. Competitive Environment

1. Equipment Suppliers' Strategies

a. Major (IBM, DEC, Unisys, CDC)

- IBM strategy was offensive, others was a defensive (protect client base) reaction—over next five years all will try to transition to offensive revenue source/hardware distribution channel strategy

- Most vendors are trying to leverage federal SI skills (30 year old market) into commercial environment, but this is very difficult (IBM still struggling—just reorganized; separating federal and commercial combined two years ago)

- Next Five Years:

  - Financial resources/risk cushion will help

  - More vertical market orientation, in-house rather than alliances

  - More alliances in commodity type performing resources

  - Will grow in-house business consulting skills to ward off Andersen Consulting threat

  Key Challenge: Can they overcome hardware mentality and traditions?

b. Secondary (Apple, HP, Sun, Prime, Motorola, NCR)

- Just recognizing SI is a valuable offensive channel
- Strategies vary—some as SI, some as subcontractor
- HP provides advisory service, but no SI implementation
- Next five years:
  - Will continue to exploit SI selectively in secondary status, emphasizing alliances with professional services firms, telecos, and other (i.e., nonhardware vendors); much effort will be spent marketing to these channels
  - Success dependent on product attractiveness
- Technical content
  - Continue differentiation from majors
  - Innovative offerings
- Price (competitive)
- Some will develop as primes in selected niches (e.g, Prime in CAD).

2. Professional Services Firms (Andersen Consulting and other Big 6, EDS, Computer Sceinces, Computer Task Group, SHL System House, SAIC, Oracle, Planning Research, American Management Systems)

a. History—clients dragged them into SI jobs, then they quickly saw hardware revenue and profit potential (which has diminished for most firms).

- Professional services background provides ideal management systems mentality
- Most have proprietary life cycle and CASE methodologies (IBM doesn't)
- Strong vertical market business consulting skills ("change management")
- Perception of vendor independence (positive)

b. Future

- Best chance to become dominant channel for SI and other services (especially Big 6)
  - Management mentality and management systems
  - Consultive skill
  - Existing client relationships (Big 6 more so than others)
- Cons: Some firms do not have financial resources regarding risk cushion and size of opportunities pursued
- Vendor independence issue will become secondary to solution excellence and company success as SI becomes an accepted role of hardware manufacturers

3. Telecos (AT&T, NYNEX, Ameritech, CBIS, Bell Atlantic, Bell South)

a. History:

- Primary SI motive was defensive (protect erosion of network business), voice and data (witness MCI et al.)
- Secondary motive—after deregulation they are all looking for new products and services
- "Fits and starts"—many early failures
- Teleco mentality (regulated...) is a problem
- NYNEX—acquired AGS (professional services firm), $100 million revenue
  Ameritech—SHL alliance
  Bell Atlantic—AMS alliance
- Others' (including AT&T) strategies are unclear/confused
- Networking expertise doesn't generate sufficient vertical market skill.

b. Future:

- Continued focus on defensive network protection strategy and network intensive SI opportunities
- Continue search for alliances
- Regulatory cloud will ease in next five years, but teleco mentality won't.

- Don't expect much success
- Low tolerance for risk

4. Other (aerospace, Bechtel, McDonnell Douglas Systems Integration, Boeing Computer Services, Grumman/GDS, Martin Marietta Data Systems)

   a. History:

   - Most of these firms
     - Have extensive federal experience
     - Are retrenching commercial IS operations
   - Aerospace/federal mentality
   - Emphasizing SI business which is synergistic with parent's business (e.g., MDSI/CAD and insurance, BCS/ networking and supercomputers)
   - All have systems operations experience
   - They emphasize technical skills in SI work

   b. Future

   - Slowdown in federal SI market will motivate commercial SI pursuits
   - Will continue pursuing commercial SI with marginal results due to mindset and lack of marketing skills and sales coverage
   - Successful vendors will be niche oriented.

Role of UNIX Mainframes in U.S. Systems Integration Business, 1989-1994

IV. Role of UNIX Mainframes in U.S. Systems Integration Business (1989-1994)

A. Current Status of UNIX in the U.S.

1. Strong user support due to advantages:

   - Portability ("takes hardware out of the decision")
   - Scalability (micro to supercomputer)
   - Standard environment for developers
   - Communication capabilities
   - Lower-cost storage and peripherals
   - European commitment to UNIX

2. Federal government support (largest single user)

3. Majority of UNIX activity is:

   - On minis and workstations
   - End user controlled
   - Distributed application/"work group computing" (e.g., branch office automation, engineering design teams)
   - Technical rather than commercial applications (80% are compute-intensive)
   - Without strong vertical market emphasis (leaders are government, telecom, finance, manufacturing)

4. Under public pressure, all major hardware vendors have announced UNIX support.

B. Mainframe UNIX Growth Obstacles:

1. Lack of technical capability for "mainstream corporate data center" processing:

   - Strong RDBMS, e.g., DB2
   - Transaction processing subsystem, e.g., CICS
   - DASD bottleneck solutions (I/O bound)
   - Security
   - Support for record indexing and virtual memory
   - Not user friendly
   - Fault-tolerant/"nonstop" processing

2. Hardware vendors (e.g., IBM, DEC) are not motivated to emphasize UNIX since it runs counter to their proprietary technology (e.g., IBM's SAA) and threatens account control. Only Amdahl has fully embraced UNIX, because it has nothing to lose!

3. Controversy over standards (O.S.F. versus UNIX International)

4. Users have enormous investments in proprietary solutions.

5. Users are uncertain about how to adopt "open systems" in their information systems planning.

Typical User Questions:

- How can we put together an open systems strategy?
- What are the organizational implications of open systems? Must I disperse? Does my staff have the right skills?
- Does an open systems environment require development from the ground up? Or can I integrate existing systems with an open systems architecture?
- What are the scenarios for the availability of commodity software based on a standard graphical interface? On which user interface should we standardize?
- How do we manage a heterogeneous environment?
- Will "lights out" operation be feasible in an open environment? Or is a proprietary solution necessary?
- What are the critical set of standards and where are they headed in areas such as operating systems, user interfaces, data management, development environments, communications and standards verification?
- How do open systems fit into an SAA environment?
- What is the role of the repository in an open environment? Will it be open?
- How do we evaluate the business benefits of open systems?

C. INPUT Predictions (1989-1994)

1. Major standards controversy (UNIX versus OSF) will be resolved within two years.

2. The critical processes of change will be very slow:

   - U.S. mainframe hardware vendors' real support for open systems will be at minimum pace (only exception: Amdahl).

   - Technology to support mainframe UNIX-based "mission-critical" corporate applications will initially come from third parties, e.g., Oracle, but these don't have enough muscle to bring all the pieces together rapidly.

   - Users will not move aggressively into mainframe UNIX applications because of the:

     - Lack of application and operation support tools
     - Prior investment in proprietary solutions
     - Confusion and uncertainty in planning and implementation

3. UNIX growth will be in **new** applications that are relatively standalone and independent of other corporate information systems.

D. INPUT Conclusions on UNIX' Role in Systems Integration

1. UNIX will **not** be a significant factor in the U.S. systems integration market in the next five years (through 1994) because:

   - SI projects emphasize the enhancement and integration of existing systems (not new ones).
   - SI projects typically require robust data base and nonstop transaction processing capabilities.
   - The role of UNIX imbedded in a proprietary mainframe system corporate environment is doubtful at this time.
   - INPUT identified only four system integrators currently pursuing UNIX:
     - DMR, Inc.: $160 million Canadian professional services company with an Open Systems consulting group
     - Ameritech: 2 of 8 outstanding proposals are UNIX-based (all DEC VAX—no mainframes involved)
     - NYNEX: AGS group is working on an SAA-to-UNIX connection; no UNIX SI proposals or contracts
     - AT&T: Primarily for distributed applications

2. The most likely fit for UNIX in the U.S. systems integration market is in work group oriented projects involving workstations, LANs, and servers.

3. Mainframe UNIX opportunities will be mostly limited to conversion services for data centers that decide to migrate to UNIX.

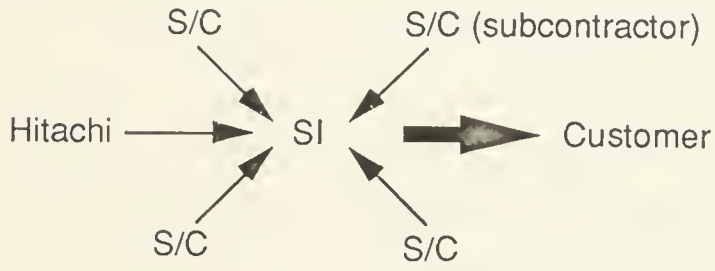
D. INPUT Conclusions on UNIX Role in Systems Integration (continued)

4. There will also be a need for connecting data center mainframes (proprietary systems) with distributed UNIX work group systems, but this does not involve mainframe UNIX processors.

5. Systems integration does, however, offer distribution channel opportunities for Hitachi's current PCM product line as discussed in the balance of this report.

Case #1: Subcontractor Role

V. Case #1: Subcontractor Role



A. Business Description

1. Integration Service Level/Typical Projects

- Hardware or application intensive projects

2. Services Offered

- Equipment (PCM only, M series probably not viable)
- Installation
- Maintenance
- Leasing

3. Role of Other Hitachi U.S. Operations

- Primarily HDS—including sales, marketing, and maintenance

4. Fit with SIs by Type

- Hardware Manufacturers—None
- Telecom Companies—Good fit because they want IBM PCM hardware offering (exception: ATT, due to standards conflict)
- Professional Services—Good fit, Hitachi offers an IBM option, but must have strong price incentives

- Spin Offs (e..g., aerospace)—Limited fit, technology driven, must offer technical excitement to attract them

5. Impact of Market Evolution Assumptions

   - Market open 75% (only exclusion is platform integration), including application and network projects

   - M Series machine (non-PCM) limits market to Japanese customers who already have them (forget these machines otherwise)

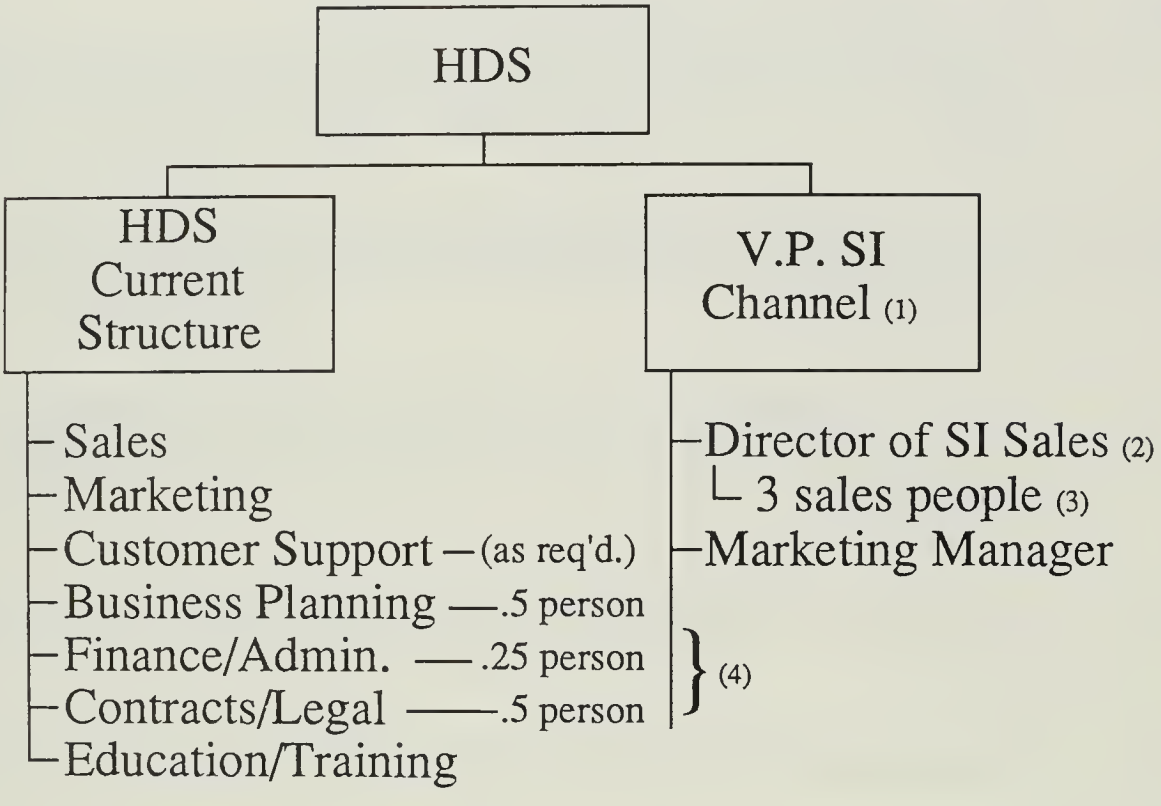
B. Infrastructure Required (1990-1995)

1. Functional Requirements:

Priority	(H = High, M = Medium, L = Low)*
H	Sales and Presale Support—must have elite subgroup dedicated to attracting and maintaining alliances with SIs
L	Marketing and Promotion—limited audience (prime integrators)
H	Customer Support—always very important/major selling point (installation, maintenance, and technical support)
M	Planning—emphasis on technology innovation where it fits
M	Finance and Accounting—primarily pricing/discounts
M	Legal and Contracting—be prepared to handle unusual Ts and Cs and requests (like risk sharing and risk management, complex pricing concessions)
L	Policies and Procedures—few issues to deal with
M	Project Management—low requirement, but subtle opportunity to demonstrate awareness, impress SI primes, and win repeat business
L	Internal Education/Training—few requirements (small, narrow organization) beyond maintenance, UNIX, etc.

* Relative to other strategy options

2. Organization Structure



Notes: (1) Primary skill required is internal HDS facilitation. This person is probably a current strong HDS executive. Should stay at HDS headquarters location.

(2) Should be an outside hire with deep SI experience emphasizing established relationships with target prime integrators. Locate in CA with his boss.

(3) Pick three top HDS sales people; geographically disburse them (e.g., Washington, D.C., Chicago, Dallas).

(4) Hire people with some SI background if possible

3. Staffing Plan

	Year 1	Comments
VP SI Channel	1.00	
Sales and Support	4.00	
Marketing	1.00	SI seminars and trade shows, equipment to SI vendor demonstration centers if required
Customer Support	0.00	Use HDS
Planning	0.50	
Finance and Accounting	0.25	
Legal and Contracting	0.50	
Policies and Procedures	0.00	
Project Management	0.00	
Internal Education/ Training	0.00	Hire the right people instead
Systems Operations	0.00	
	7.25	

4. Other Skills/Resources Required

- None

5. Investment Requirements

a. Annual People Cost

Skill Area	Unit Cost Assumptions ($ Thousands)		Number of People	Case #1 Invest. ($ Thous.)
VP SI Channel	150 + fringe 30%	= 195	1	195
Sales and Support	*Director 120 + fringe 30%	= 156	1	156
	Sales 100 + fringe 30%	= 130	3	390
Marketing	80 + fringe 30%	= 104	1	104
Planning	50 + fringe 30%	= 65	.5	33
Finance and Accounting	40 + fringe 30%	= 52	.25	13
Legal (100) and Contracting (60)	80 average + fringe 30%	= 108	.5	54
Policies and Procedures				
Project Management				
Internal Education/ Training				
System Operations				
Total Annual Cost			7.25	945

b. **No Other Investments Required**
- **Use HDS facilities for hardware demos**

c. **Total investment: 2 years x $945K = $1.9 M**
***Retained search cost (@ 30% of base salary) = .036**
Total = 1.9 M

C. Overall Case #1: Subcontractor Role Evaluation

1. Advantages:

- Lowest initial investment
- Lowest financial risk
- Lowest image exposure

2. Disadvantages:

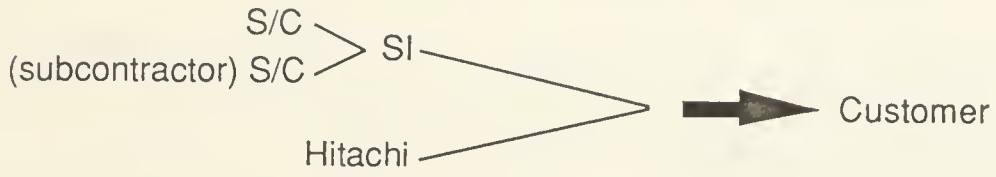
- Least control over destiny (can be ignored by SIs)
- No end user contact/relationship development
- Least value added (commodity business)
- Deepest discounts/lowest profit levels
- Potentially slow and uncertain revenue development

In a word...

Simplest, Low Risk Approach

Case #2: Teaming/Risk Sharing Option

VI. Case #2: Teaming/Risk Sharing Option



A. Business Description

1. Integration Service Level/Typical Projects

Limited to:

a. HDS incumbent hardware situations where HDS is "finder" and lacks skills to implement the integration task (typically network and application integration jobs.)

b. Finder SIs that need both an alternative to IBM and deep pockets/risk sharer to compete (could be all three integration project types)

- Joint bid
- Higher level of risk sharing
- Finder usually takes lead
- Hitachi must trust SI
- SIs will typically be second tier (except for EDS and other first tier professional services SIs who need an IBM alternative)

2. Services Offered

- Hardware
- Maintenance
- Installation
- Hardware leasing
- Project financing and lease back

3. Role of Other Hitachi U.S. Operations
   - Primarily HDS—sales, marketing, and maintenance
   - $ from Tokyo…
4. Fit with SIs by Type
   - Hardware Manufacturers—None
   - Telecom Companies—Good
   - Professional Services—Good
   - Spin Offs (e..g., aerospace)—Good
5. Impact of Market Evolution Assumptions
   - Hitachi should focus on replicable solutions (like competition will)
   - Target UNIX-based opportunities as/if they emerge

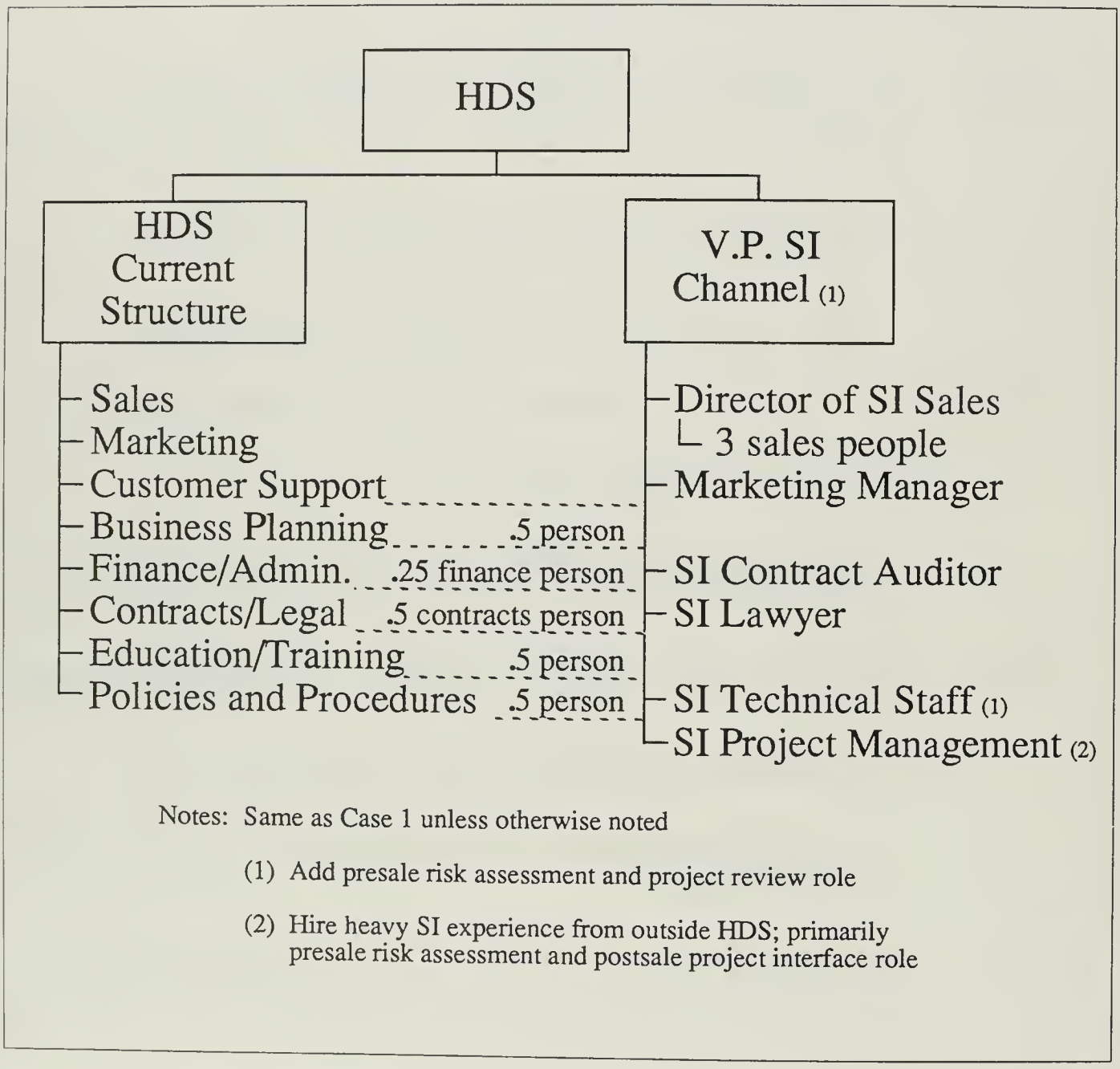
B. Infrastructure Required (1990-1995)

1. Functional Requirements:

Priority	(H = High, M = Medium, L = Low)*
H	Sales and Presale Support—same as Case #1 (elite sales group)
L	Marketing and Promotion—same as Case #1
H	Customer Support—always high
M	Technical Staff—technical risk management expertise
M	Planning—same as Case #1
M	Finance and Accounting—risk assessment and project audit skill
M	Legal and Contracting—add risk management expertise
M	Policies and Procedures—for risk management
H	Project Management—SI oversight role and risk evaluation (presale)
L	Internal Education/Training—educate affected HDS personnel/new hires on SI environment, sales process, risk management, etc.

* Relative to other strategy options

2. Organization Structure



Notes: Same as Case 1 unless otherwise noted

(1) Add presale risk assessment and project review role

(2) Hire heavy SI experience from outside HDS; primarily presale risk assessment and postsale project interface role

3. Initial Staffing Plan

	Case 1	Case 2 Add-ons	Comments
UP/SI Channel	1.00		
Sales and Support	4.00	0.00	
Marketing	1.00	0.00	
Technical Staff	0.00	2.00	Too many technologies for one person to cover
Customer Support	0.00	0.00	use HDS
Planning	0.50	0.00	
Finance and Accounting	0.25	1.00	Contract audit function
Legal and Contracting	0.50	1.00	Risk management
Policies and Procedures	0.00	0.50	Risk management procedures
Project Management	0.00	2.00	Presale risk evaluation, postsale project oversight
Internal Education/ Training	0.00	0.50	

7.25 + 7.00 = 14.25 people total

4. Investment Requirements (Cost) Assumptions

a. Annual People Cost

Skill Area	Unit Cost Assumptions ($ Thousands)		Number of People	Case #2 Invest. ($ Thous.)
VP SI Channel	150 + fringe 30%	= 195	1	195
Sales and Support	*Director 120 + fringe 30%	= 156	1	156
	Sales 100 + fringe 30%	= 130	3	390
Marketing	80 + fringe 30%	= 104	1	104
Technical Staff	*70 + fringe 30%	= 91	2	182
Planning	50 + fringe 30%	= 65	.5	33
Finance and Accounting	Finance 40 + fringe 30%	= 52	.25	13
	*Contract 50 + fringe 30% Audit	= 65	1	65
Legal and Contracting	*Senior 100 + fringe 30% Legal	= 130	1	130
	Contract 60 + fringe 30%	= 78	.5	39
Policies and Procedures	60 + fringe 30%	= 78	.5	39
Project Management	*90 + fringe 30%	= 117	2	234
Internal Education/ Training	40 + fringe 30%	= 52	.5	26
Total Annual Cost			14.25	1,606

b. Total investment required: 2 years x $1.6 M = $3.2 M
*Retained search cost (@30% of base salary) = .2
Total = $3.4 million

C. Overall Case #2 Evaluation

1. Advantages:

- Offers direct client contact and relationship building
- Leverages Hitachi's financial strength
- Entry into SI market without need for major investment in technical and vertical industry expertise

2. Disadvantages:

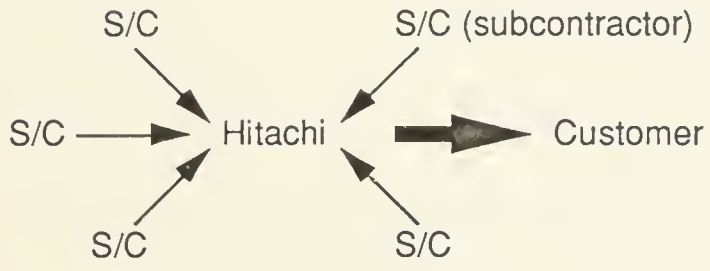
- Don't have total control over risk—must trust SI partner
- Potentially slow and uncertain revenue development
- Need for project financing is a small % of total projects

In a word...

Clever Way to Protect Installed Base and Open Door to Broader SI Market

Case #3: Full SI—Platform Level

VII. Case #3: Full SI—Platform Level



A. Business Description

1. Integration Service Level/Typical Projects

Business focus on platform integration for PCM and UNIX M660 situations. Network or especially application level would require acquisitions to provide the necessary technical and vertical market expertise.

2. Services Offered

- Project management
- HDS
  - Equipment
  - Maintenance
  - Training and education
- HICOM
  - Communications software?
- Project financing/lease back

3. Role of Other Hitachi U.S. Operations

- Primarily HDS—sales, marketing, and maintenance
- $ from Tokyo…

4. Fit with SIs by Type

   - Hardware Manufacturers—None (competitors)
   - Telecom Companies—As subcontractor to HDS
   - Professional Services—As subcontractor to HDS (except alliances as S/C)
   - Spin Offs (e..g., aerospace)—As subcontractor to HDS

5. Impact of Market Evolution Assumptions

   - HDS LAN expertise may be useful for platform integration
   - HDS will have same PCM business concerns in SI market (maintaining consistency with IBM future direction)
   - Represents "value added hardware offering"—will be tough competing where price/performance is the only selling point (problem is: the more value added there is, the greater the price advantage dilution).
   - U.S. platform integrators will apply expanded vertical market expertise creating even more competition.

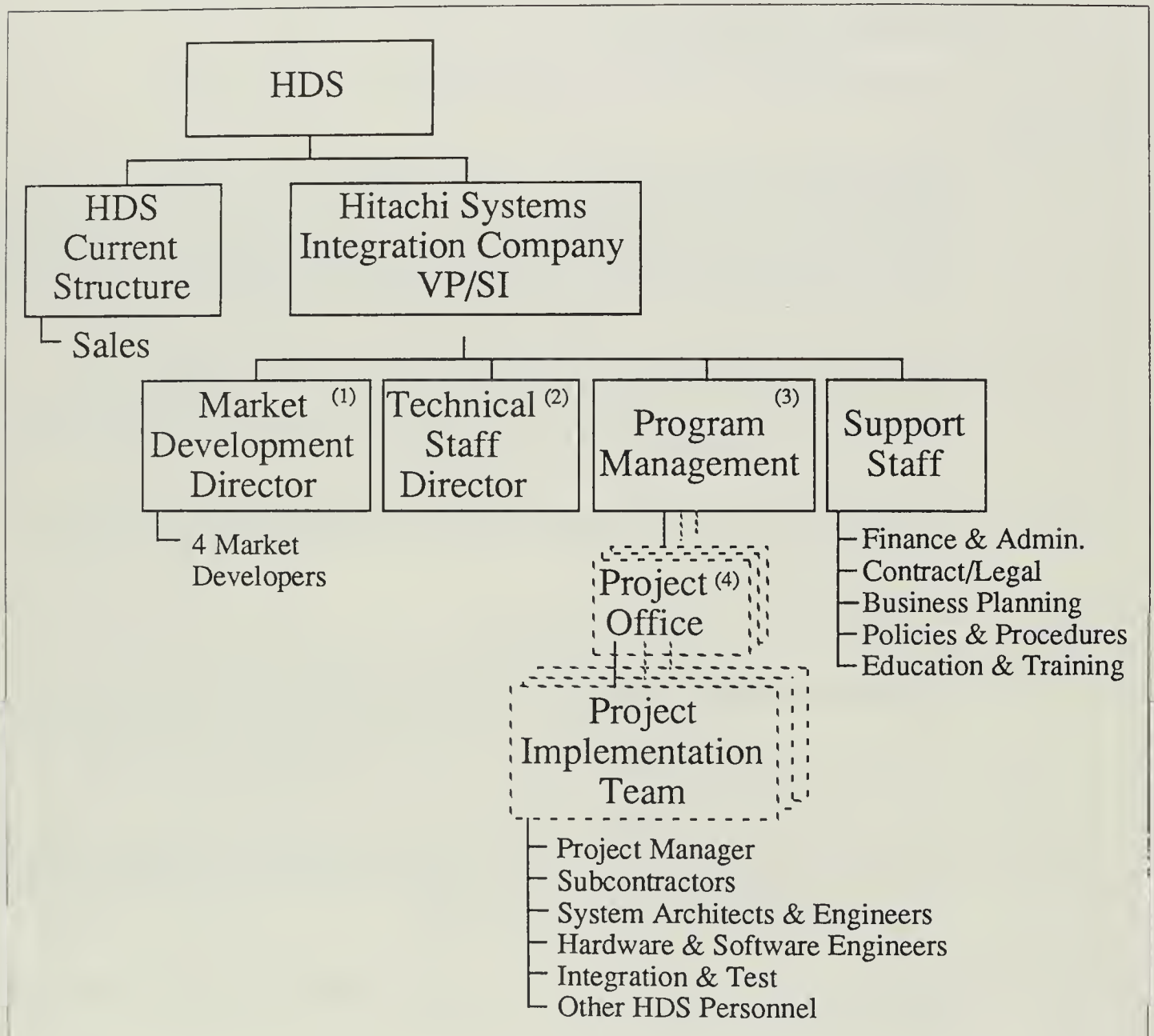
B. Infrastructure Required (1990-1995)

1. Functional Requirements:

Priority* (H,M,L)	
H	Sales and Presale Support—work with HDS sales regarding lead generation and qualification. Need account development type sales people who can go in a DP shop (or more likely a higher management level) and get HDS in the bidding
M	Marketing and Promotion—heavier promotion role than cases 1 and 2; challenge is to identify niches for PCM solutions and support the sales process
H	Technical Staff—experienced SI and multivendor technologists required
M	Business Planning—as usual
M	Finance and Accounting—in addition to product pricing and discounts, must now price SI deals including non-Hitachi products and services
M	Legal and Contracting—much more complex—subcontractor as well as client agreements (if federal SI is targeted, plan for 100% more complexity and staff)
M	Policies and Procedures—for subcontractor relationships and general risk management
H	Project Management—critical requirement regarding sales effectiveness, quality control, and risk management (must support complex solution sales effort, help develop proposals, find subcontractors
M	Internal Education/Training—for products, project management customer interface skills, subcontractor management

* Relative to other cases

2. Organization Structure



Notes: (1) Role is lead generation and qualification; staff with two insiders and two outsiders; locate in HDS regions; give each person responsibility for 10 HDS offices

(2) Presale and oversight role; this is the general manager's technical conscience in problem/conflict resolution

(3) Primary delivery organization

(4) Planning and control role

3. Case 3 Staffing Plan

	Case 2	Case 3 Additions	Year 1 Total Personnel	Comments
VP Systems Integration	1.00	1.00	1.00	Company general manager
Market Development (Sales and Marketing)	5.00	0.00	5.00	
Technical Staff	2.00	1.00	3.00	Increased complexity
Planning	0.50	0.50	1.00	More proactive strategy
Finance and Accounting (2 Junior and 1 Senior)	1.25	0.75	3.00	Subcontractors for the first time
Legal and Contracting	1.50	1.50	3.00	Subcontractors for the first time
Policies and Procedures	0.50	0.50	1.00	More complexity
Project Management (1 per contract)	2.00	0.00	2.00	Minimum critical mass
Internal Education/ Training	0.50	0.50	1.00	New skill to learn
	14.25	5.75	20.00	

4. Other Skills/Resources Required

- Technology demo center
  - 20K sq. ft. x $2.00 sq. ft. x 12 months = $480,000
  - Computer hardware — Rotate equip.
  - Misc. peripherals = 200,000
  - Planning and subcontractor participation = 180,000

  $860,000/year

- Promotion costs (seminars, brochures, advertising) $300,000 per year

5. Investment Requirements (Cost) Assumptions

a. Annual People Cost

Skill Area	Unit Cost Assumptions ($ Thousands)		Number of People	Case #2 Invest. ($ Thous.)
VP SI	150 + fringe 30%	= 195	1	195
Market Development	*Director 110 + fringe 30%	= 143	1	143
	Others 80 + fringe 30%	= 104	4	416
Technical Staff	*Manager 90 + fringe 30%	= 117	1	117
	*Others 70 + fringe 30%	= 91	2	182
Planning	50 + fringe 30%	= 65	1	65
Finance and Accounting	*Senior 70 + fringe 30%	= 91	1	91
	Junior 40 + fringe 30%	= 52	2	104
Legal and Contracting	*Legal 100 + fringe 30%	= 130	1	130
	Contract 60 + fringe 30%	= 78	2	156
Policies and Procedures	*60 + fringe 30%	= 78	1	78
Project Management	*120 + fringe 30%	= 156	2	312
Internal Education/ Training	60 + fringe 30%	= 78	1	78
Total Personnel			20	2,067

b. People investment required: 2 yrs x $2.1 M = $4.2 M
*Retained search cost (@ 30% of base salary) = 0.3

c. Technology demo center = .9 x 2 years = 1.8

d. Promotion investement: 2 yrs x $300 K = 0.6 M

Total investment = $6.9 M

C. Overall Case #3 Evaluation

1. Advantages:

- Synergistic with Hitachi base business (skills and hardware)
- Protects installed hardware base
- Least investment required to become SI
- Hitachi begins to move from commodity to value added solution supplier
- Foundation for packaged application integration niche efforts
- Laboratory for advanced Hitachi solutions (source of new product requirements)

2. Disadvantages:

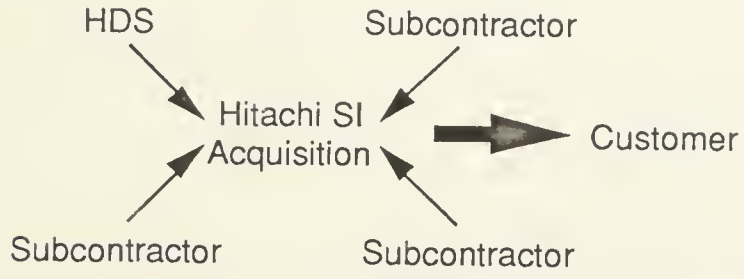
- EDS likely to feel uncomfortable
- Site incumbent will be in very strong position
- Market mostly limited to sites where Hitachi is already installed unless it's an exclusive solution (e.g., UNIX and packaged application, and then it isn't platform integration anymore)
- Beyond installed base, heavy emphasis on developing a market versus serving one
- Longer startup time—must hire technical resources (minimum 12 months to staff to productive level)

In a word...

Synergistic Growth Option with Minimal Investment

Case #4: Application Level Integrator

VIII. Case #4: Application Level Integrator



A. Business Description

1. Integration Service Level/Typical Projects

- Provide application solutions including development of platforms, some degree of networking, and application development.

2. Services Offered

- Application development and integration as well as platform and network integration when required.

3. Role of Other Hitachi U.S. Operations

- HDS only; diminished role compared to Case #3 (secondary/occasional subcontractor versus primary , secondary or no support services role versus primary support services subcontractor)

4. Fit with SIs by Type

Because of nature of SI, will occasionally require resources of other vendors

- Hardware Manufacturers—no fit
- Telecom Companies—subcontractor
- Professional Services—subcontractor
- Other (e.g., aerospace)—subcontractor

5. Impact of Market Evolution Assumptions

a. This alternative requires the full range of SI skills. While some of Hitachi's products and services apply, it is unlikely that an application oriented SI group can be built internally without extreme risk of failure. While acquisition includes its own risk, it appears the most certain alternative to becoming a full application systems integrator.

b. This will provide channels for existing hardware products and a source of more rapidly growing services revenue. Should look for acquisitions that provide vertical industry knowledge and business consulting skills.

c. Acquisition strategy should be flexible.

- First: Search for a single large acquirable professional services type commercial system integrator with a good reputation such as SHL Systemhouse. Build the future on this nucleus and existing infrastructure. SHL is especially attractive because it (1) is a Canadian company and (2) has a relationship with Ameritech which adds networking expertise.

- Second: If such a company is not available when Hitachi wishes to act, then pursue acquiring a collection of smaller professional services companies, each fulfilling specific objectives (the "CSC model"). This is a slower, less certain approach.

B. Infrastructure Required (1990-1995)

1. Functional Requirements:

Priority* (H,M,L)	
H	Sales and Support—application-oriented selling—typically requires ability to demonstrate companies' strong industry and/or application knowledge (or strong methodology ap-poach, e.g., SHL Systemhouse)
H	Marketing and Promotion—Large vendors (e.g., Andersen, IBM, Unisys, DEC, NYNEX) have aggressive marketing programs.
M	Business Planning—nothing special
M	Finance and Accounting—similar to Case #3, plus pricing and risk assessment of large application programming tasks
H	Legal and Contracting—similar to Case #3, may have more subcontractors to share risks
H	Policies and Procedures—strong technical procedures and policies required to mitigate risks
H	Project Management—strong entrepreneurial program management requirements; need supporting measurement and incentive programs; program management methodologies are important as part of the organization's culture
H	Internal Education/Training—extensive for software development and program management skills

* Relative to other cases

2. Organization Structure (assume single large acquisition)

   - Retain organization of acquired company. Place it on equal level with three existing Hitachi U.S. organizations.

3. Staffing Plan

   - Comes with the acquisition

4. Other Skills/Resources Required

   - None

5. Investment Requirements (Cost) Assumptions

- Assume SHL acquisition: (bargain deal)

  - 26.5 million shares x $7.00/share = $186 million

$$\frac{\text{\$186 million market capitalization}}{\text{\$630 million 1989 revenue}} = 30\%!$$

- More realistic acquisition cost = $400 million

C. Overall Case #4 Evaluation

1. Advantages:

- Certain and significant revenue stream
- Participate in full SI market growth
- Adds a strong professional services capability to Hitachi U.S.
- New internal channel for Hitachi products
- Stengthens account control with existing and new customers
- Much stronger Hitachi position in U.S. markets—opens many more opportunities
- Hitachi has financial resources to permit professional services firm to bid on larger projects
- Appearance of hardware supplier independence (keep acquired company's name)

2. Disadvantages:

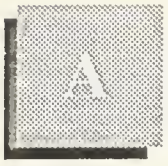
- EDS likely to be very upset
- Typical risks of acquisitions, e.g., key people may resign.
- U.S. hardware companies display difficulty in converting to and adequately integrating service offerings into hardware companies. Hitachi needs to assess this "hardware mind set" problem.

In a word...

Highest Certainty of Significant Market Share

Appendixes

Appendix: Electronic Data Systems (EDS)



Appendix: Electronic Data Systems (EDS)

1. Key SI Contacts:

Corporate Business Development
Gary J. Fernandes
Senior Vice President

Manufacturing, Warehousing and Distribution Segment
Paul Chiapparone
Senior Vice President
Hank Johnson
President, Manufacturing and Distribution
Services Division

Federal Government Segment
G. Stuart Reeves
Senior Vice President

International and Global Industries Segment
Mal Gudis
Senior Vice President

2. Description of Principal Business

Electronic Data Systems (EDS) was originally founded in 1962 by Ross Perot to provide systems operations services to insurance companies, government-funded health insurance programs, and financial institutions. Today it provides systems operations, processing services, professional services, and systems integration services to nearly all vertical industries and to the federal government. In addition, EDS may act as a fiscal agent for a client, taking full responsibility for data processing as well as other administrative duties such as paying and processing insurance claims.

EDS is among the leaders in providing systems integration to the federal government and entered the commercial systems integration market in the early 1980s, gaining experience and a substantial lead in this area.

EDS was acquired by General Motors in 1984 and is operated as a wholly owned subsidiary. EDS provides virtually all information processing services to General Motors.

3. EDS Competitive Position

EDS is the largest systems operations and processing provider in the world and had worldwide 1989 revenues of $5.47 billion and net income of $435 million. Approximately 55% of EDS's revenues are from captive GM business and the remainder is from systems operations and other professional services for outside clients.

EDS brings a strong set of capabilities and resources to the SI table. Its operational data processing experience, including developing and operating large and small data centers, makes it a real "pro" in the efficient and cost-effective use of technology. Its systems operations experience with insurance companies and financial institutions provides it with applications knowledge of these industries. The assumption of all information systems responsibility for General Motors provides it with real business experience in the manufacturing, retail, distribution, and networking areas. And its alliance with GM Hughes provides it with aerospace industry knowledge.

The purchase by GM further adds to EDS's strengths. It provides huge financial resources to support bids, on the largest opportunities and the buying power of one of the nations largest corporations. This buying power will provide it with other vendors' products at the lowest possible price and the leverage to support its strategy of being the low-cost bidder.

4. Markets Served

EDS recently restructured its organization and has organizations that focus on virtually all vertical markets. Its historical focus has primarily been the following vertical markets:

- Federal government
- State and local governments
- Banking and finance
- Insurance
- Manufacturing

While EDS's expertise is aimed primarily at vertical industries, the company has targeted two key cross-industry markets: engineering and networking—both areas where the company has gained a great deal of experience through its work at GM.

To become a major systems integrator, EDS has targeted the federal government, discrete and process manufacturing, aerospace, and retail distribution vertical markets. It is also making a major thrust at expanding this capability into the international market. (See Exhibit EDS-1). Under it new organizational structure, EDS will focus on all vertical markets.

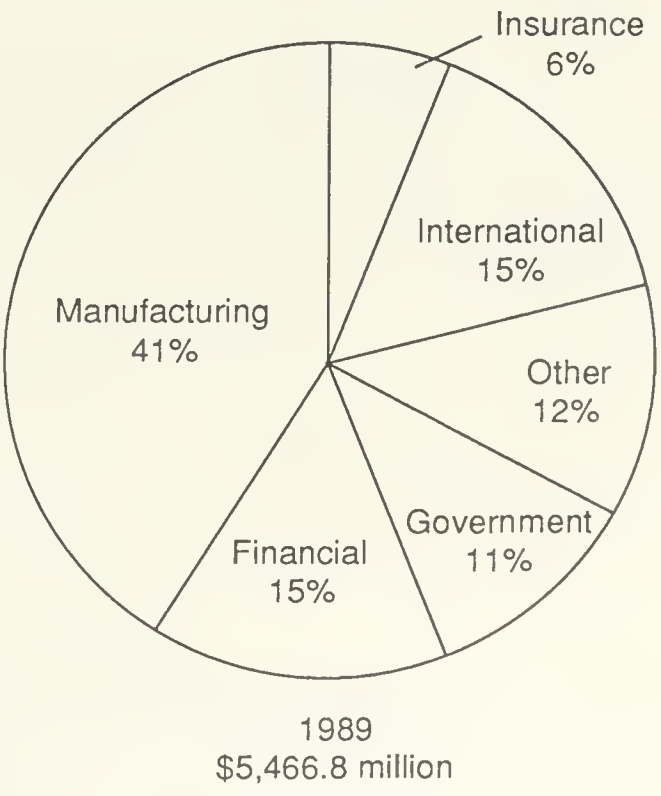
EXHIBIT EDS-1

SI Vertical Market Focus—EDS

- Federal Government
- Discrete Manufacturing
- Process Manufacturing
- Retail and Distribution
- Aerospace

EDI's 1989 revenues were distributed as shown in Exhibit EDS-2.

EXHIBIT EDS-2



5. Recent Events

In November 1987, EDS entered an agreement with Tandem Computers to jointly develop and market products and services to help manufacturers connect and integrate multivendor business, engineering, and factory control systems.

During 1987 EDS began negotiations to acquire MTech and the servicing responsibilities for the third-largest ATM (automated teller machine) network in the U.S. The acquisition was completed in 1988. In 1987 EDS also acquired M&SD Corp, a supplier of telecommunications services and equipment.

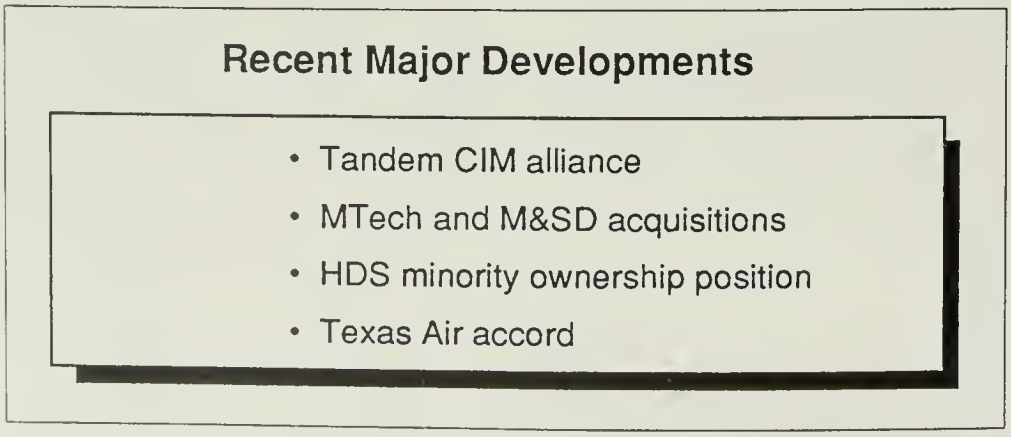
Perot sold his interests in GM-EDS and resigned from the GM Board of Directors because of fundamental differences he had with GM's management style and system. At that time Perot agreed that he would not compete with EDS for profit for a three-year period. During 1988 Ross Perot formed a new firm, Perot Systems, focused on systems integration and a direct competitor to EDS.

In March 1989, EDS entered into negotiations to purchase 20% ownership of National Advanced Systems (NAS), the other 80% to be held by the Japanese computer manufacturer, Hitachi. This investment in the company now called Hitachi, USA provides EDS with a low-cost source of computer hardware and enhances its strategy to become the low-cost provider of information processing solutions.

In early 1990, EDS entered into a potential multibillion-dollar, 10-year accord with Texas Air Corporation. EDS is investing $250 million in the airline's System One computerized reservation subsidiary for 50% ownership. Included is EDS's management of four data centers and control of 2,200 Texas Air employees.

Recent developments are summaried in Exhibit EDS-3.

EXHIBIT EDS-3



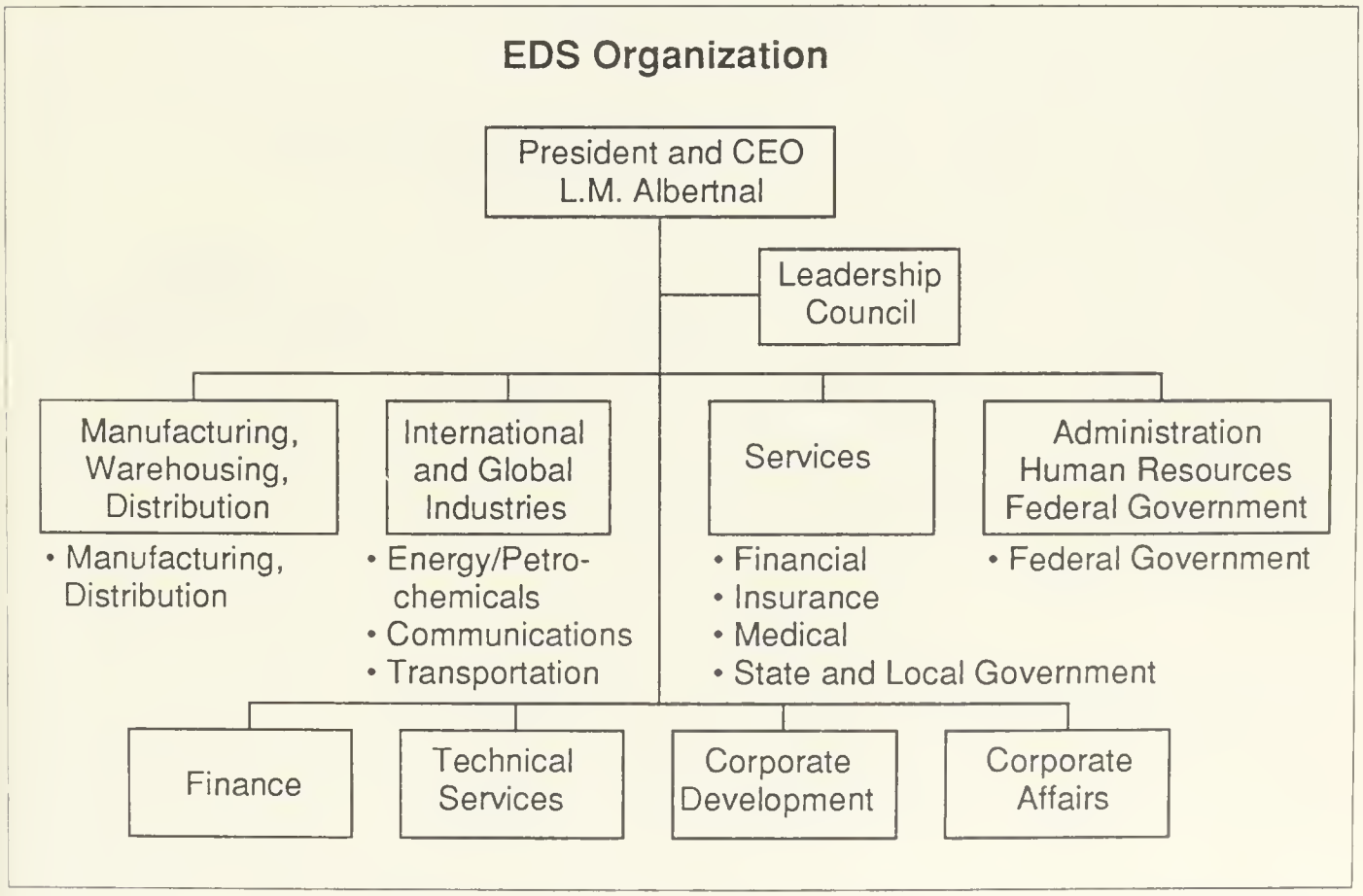
6. EDS Organization

In late 1989, EDS announced major changes to its organization. Eight of its senior executives were given oversight for eight major business segments and were also assigned to the new Leadership Council. The Council has been established to provide a high-level focus on strategic planning.

The reorganization also establishes a large number of business units (well over fifty), most with divisional status, with responsibility for specific market opportunities. Most of these organizations have a specific vertical industry market focus. Similar to its major competitors, EDS has recognized the importance of building solutions for each type of customer.

Exhibit EDS-4 depicts the new EDS organization and the eight major business segments. Vertical industry market responsibilities are also identified.

EXHIBIT EDS-4



In interviews with INPUT, EDS stated that it is in the systems management business and systems integration is an essential component of that business. It also stated that most of its employees have operational experience that can be applied to SI. INPUT's estimates of EDS's 1989 SI revenues are shown in Exhibit EDS-5.

EXHIBIT EDS-5

EDS Systems Integration Revenues, 1989

Business Component	$ Millions
Federal	350
Commercial	150
Total	500

EDS has 58,000 employees worldwide. As mentioned above, many of these employees have skills and knowledge that can be applied to SI. INPUT has not attempted to estimate the number of personnel assigned to SI, although they are distributed among the various functional disciplines as shown in Exhibit EDS-6.

EXHIBIT EDS-6

Distribution of SI Personnel EDS

Capability	Percent	
	Commercial	Federal
Management, strategy, planning	3	1
Legal/contract administration	1	1
Project management	10	5
System development/ implementation	75	78
Hardware/software evaluation/ acquisition	10	10
Hardware engineering	0	0
Sales	2	5

When interviewed, the EDS organizations that address most SI opportunities responded quite differently as to how they were organized to execute and manage SI contracts. This is illustrated in Exhibit EDS-7.

EXHIBIT EDS-7

Centralization/Decentralization of SI Business Functions Electronic Data Systems

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	D
Marketing and promotion	C	D
Account management/ sales	C	D
Contract review/approval	C	D
Project management/ control	B	D
Implementation/development	B	D
Hardware/software acquisition	C	C
Systems operations	C	C

C = Centralized, D = Decentralized, B = Both

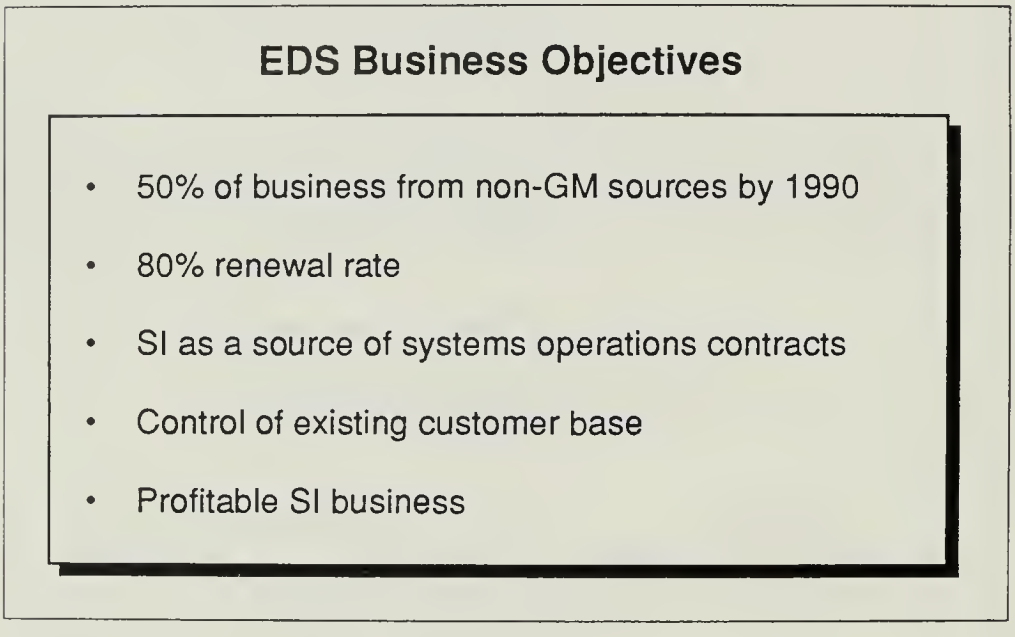
The Government Systems Group operates in a decentralized mode, with the exception of hardware and software acquisition and systems operations, which are controlled centrally. The commercial organizations have been more centrally controlled, with all activities except strategy and long-range planning, project management and control, and implementation and development controlled from Dallas. These three responsibilities were shared by Dallas and decentralized locations. INPUT believes that the major reason for the differences in these responses has been a result of the different customer requirements and the commercial organizations' proximity to EDS corporate headquarters.

As EDS's new organization unfolds, with its focus on more autonomy and delegation of decision authority, INPUT anticipates that commercial organization will become much more decentralized.

7. SI Objectives and Revenues

EDS's business objectives are identified in Exhibit EDS-8. Management has set a goal of reducing its dependence on GM business to 50% by 1990. It is attempting to accomplish this by holding GM-derived revenues level, while continuing to increase traditional non-GM revenues by around 30%.

EXHIBIT EDS-8



EDS also has a business objective of maintaining a client renewal rate in excess of 80%. It is offering systems integration in response to its customers' demands, and recognizes it as a vehicle to attract new systems operations candidates and to maintain control over its existing customer base.

Finally, the company is looking to the SI business to earn a profit.

8. Internal SI Capabilities Evaluation

- Business Consulting—EDS has good consulting experience in the area of developing large projects. It has very good technical consulting capability based on its extensive systems operations experience. Vertical-industry business consulting capability should be particularly strong in its base businesses—process and discrete manufacturing, retail and distribution, aerospace, and networking—all areas of SI concentration. EDS' new organization should improve its knowledge of additional vertical industry markets.

- Design Methodology, Design and Integration, Project Management, Software Development, Education, Training, and Documentation—Based on the experience it has gained both in its basic systems operations business and at GM, EDS is very capable in all of these areas.

- Packaged Application Software—EDS has developed and acquired a number of vertical market packages that it uses in its traditional business. Examples are The Insurance Machine™ for the insurance industry and Flagship™ for credit unions. It is not clear what role these products may play in SI-only, non-facilities-management projects. EDS indicated in its survey response that it would prefer to use all off-the-shelf products.

- Packaged Systems Software—The company prefers to use off-the-shelf products provided by other vendors.

- Standard Computer Hardware—EDS uses standard off-the-shelf hardware provided by other computer manufacturers. EDS will most likely incorporate more Hitachi/NAS products in its bids.

- Custom Computer Hardware—EDS's commercial systems integration organization indicates that it has some custom hardware capability, but it would clearly prefer to use off-the-shelf hardware.

- Network Management and Operations—EDS has extensive experience in developing and managing GM networks and its own network that supports its processing services capability. Today it operates one of, if not the largest, networks in the world.

- Service and Repair—EDS has moderate capability in hardware service and repair.

- Software Maintenance—The company has adequate software maintenance capability.

9. SI Strategic Alliances

EDS has a formal alliance program that generally operates on a contract-by-contract basis. Alliances exist with computer hardware manufacturers, other GM organizations, customers, applications software providers, and non-U.S. partners. Examples of these alliances are shown in Exhibit EDS-9.

Hardware alliances have been established with leading vendors, including IBM, AT&T, Tandem, DEC, and Apple. The Tandem alliance includes a strong focus on the manufacturing industry. EDS's alliance with GM Hughes is focused on factory automation and telecommunications applications that require satellite-based products and services.

EXHIBIT EDS-9

EDS—Strategic Alliances

Hardware	Digital Equipment IBM AT&T Apple Tandem
Systems software	Ameritech
CIM/satellite products and services	GM Hughes Electronics
International SI	Lucky-Goldstar Telefonica
Large retail bank processing systems	Norwest Corporation Banc One Corporation
Airline reservation systems	Texas Air

Customer partnerships such as the EDS, Banc One Corporation & Norwest Corporation alliance are used to develop application offerings in areas where EDS lacks applications skills.

Software alliances, though small in number, have provided solid gains for EDS in the telecommunications market.

EDS has established a number of international alliances. In February 1987, it established a 50-50 joint venture with the Lucky-Goldstar Group, called System Technology Management (STM), to provide systems integration, data processing, and communications services to the Group's 20 affiliated firms and other Korean companies.

In September 1987, EDS Communications Corp. and Telefonica (Spain's national telephone, postal, and telecommunications organization) established a joint-venture company to develop, market, sell, and install packet data networks worldwide using Telefonica's packet-switching system.

10. SI Capabilities Summary

EDS has a very strong set of capabilities and few weaknesses in the SI arena (See Exhibit EDS-10). It has outstanding information systems operating knowledge in the services industries based on its experience in running data processing installations for a great number of clients in the banking, financial, and insurance industries. It has similar experience with federal and state and local government customers.

EXHIBIT EDS-10

EDS' Competitive Status

Strengths	Weaknesses
Operational experience	Systems operations/ processing mentality
Vertical industry knowledge	Limited branch offices
Large experienced skill base	Network
Understands new technologies	
Alliances	

Based on more recent experience with General Motors, EDS has developed operating experience in virtually all areas of a large manufacturing company, from CIM applications to the consolidation and installation of a worldwide communications network.

These actual operating experiences make EDS uniquely qualified to develop and operate total information solutions. They also provide EDS with a very large and experienced skill base that can address a very broad range of industry applications.

EDS lacks hardware and software products (with the exception of its ownership position in Hitachi, USA), preferring to obtain other vendors' off-the-shelf products through its strong set of alliances. INPUT does not consider this a weakness because of EDS' strong financial resources and buying power.

EDS has a solid understanding of new technologies and integration techniques based on its experience in running 20 or more very large internal data centers and well over 100 customer premises data centers.

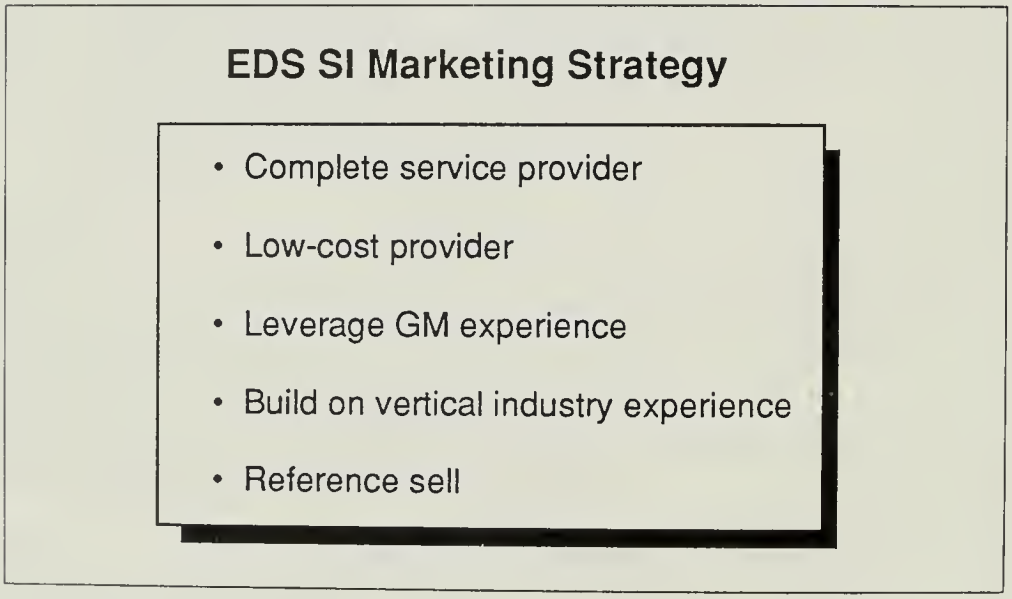
INPUT does not believe that EDS has significant weaknesses. However, its traditional systems operation focus will most likely limit its competitiveness in some systems integration opportunities. Some prospects that are committed to running their own data processing operations will be reluctant to ignore EDS's traditional motivations when an SI solution is proposed. This is justified, since it appears to INPUT that in most cases systems operations is the underlying motivation for EDS's SI activities.

EDS does not have an extensive sales office network, which may prove to be a disadvantage, as it competes with hardware manufacturers that do.

11. SI Marketing Strategy

Exhibit EDS-11 identifies the key elements in EDS's marketing strategy. The company promotes itself as a systems management firm. It wants to provide total service—from developing an integrated solution, through systems integration, to total systems operations—for the customer.

EXHIBIT EDS-11



To achieve this goal, EDS's strategy is to be recognized as the lowest-cost provider of total systems management. INPUT believes EDS will leverage its GM-based buying power with hardware and software vendors and partners (e.g., Hitachi, U.S.A.), as well as the vertical-industry application knowledge it has developed at GM and while operating other installations in other industries.

Finally, a key element of EDS's strategy is to use references from successful systems integration and systems operations contracts to help sell to new clients. The company will use its own data center processing centers to demonstrate its capabilities and will use satisfied customers as references.

12. SI Customer Base

EDS has a broad range of systems operations customers. In many cases the first stage of these contracts requires EDS to develop a total integrated system solution. The majority of its revenue, however, comes from follow-on systems operations activities. The following table, Exhibit EDS-12, identifies representative customers where INPUT believes systems integration is an element of the total systems operation offering. Contract values are not provided, since INPUT believes that the systems operation content would make these values misleading.

EXHIBIT EDS-12

Examples Of EDS's Customers and Contracts

Company/Industry	Project Description
Champion Sparkplug	Computer-integrated manufacturing
Caterpillar Tractor	Plant automation
Enron Corporation	Companywide systems management
State of Massachusetts	Welfare eligibility
U.S. Army - Project 80X	Personnel management
U.S. Navy - Spar	Global retail inventory and supply system
State of Florida	On-line Human Services delivery system

13. Summary and Future Directions

EDS's broad range of operational experiences make it a very capable competitor in the SI arena. These strengths include:

- Vertical-industry knowledge of its traditional client base as well as GM-based discrete and process manufacturing, distribution, and aerospace experience

- Operational project development and technology transition management skills, based on actually running GM and EDS data centers and communications networks. This includes the capability to manage very large projects.

- A large, satisfied customer base

- Experience, financial resources, and product-buying leverage provided by its parent, General Motors. This insures its ability to bid very large projects at very competitive prices.

- A focus on total systems management that allows EDS to spread the initial systems integration risk over a longer time period and revenue stream

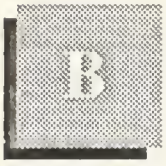
This last strength, a preoccupation with providing total systems management, may also turn out to be EDS' one major weakness. As a weakness it can:

- Lower EDS's priority on bidding on SI-only projects

- Preclude EDS from serious consideration by the SI customer that wants an integrated solution only, not a systems management contract

INPUT believes that EDS will move even more toward the total systems management concept, deriving its revenues not only from the front-end SI work, but also the follow-on systems operations contracts. The company will be extremely successful in systems management contracts, but less interested and less successful in standalone SI contracts.

Appendix: NYNEX Information Solutions Group



Appendix: NYNEX Information Solutions Group

1. Key SI Contacts

A. Theodore Engkvist
President
NYNEX Information Systems Group
4 West Red Oak Lane
White Plains, NY 10604

Dr. Gad J. Selig
Vice President & General Manager
NYNEX Information Systems Group
4 West Red Oak Lane
White Plains, NY 10604

2. Description of Principal Business

NYNEX—a combination of the former New York Telephone and New England Telephone companies—came into being as a result of the break-up of the Bell system in 1984. In common with the other regional Bell operating companies (RBOCs), NYNEX believed that in the long term it could not prosper offering only traditional, regulated telephone service.

One of NYNEX's strategic decisions was to enter the information services and software business. In 1987, NYNEX created the Information Solutions Group (ISG). One segment of ISG offers products and services developed internally by NYNEX constituents: NYNEX Computer Services Division and the NYNEX Development Company.

However, the greater part of ISG has been created via acquisition. Its major acquisitions include:

- AGS Computers (1988)
- The BIS Group (1986)
- Telco Research Corporation (1985)
- The Data Group (1985)

Section 6, below, shows the current organizational structure of NYNEX ISG units.

The different ISG business units provide NYNEX an opportunity to offer a wide range of SI services to several key vertical markets in both the U.S. and Europe.

ISG has 5,500 employees, and INPUT estimates that 1989 revenue for current ISG units was over $500 million. Only $100 million of this revenue is SI revenue (see Exhibit NYN-1); however, the majority of ISG products and services can potentially be mobilized for SI projects.

EXHIBIT NYN-1

NYNEX
1989 Systems Integration Revenues

Business Component	$ Millions
Federal	10
Commercial	90

3. Competitive Position

Many of NYNEX ISG's strengths flow directly and indirectly from the fact that its parent is NYNEX. NYNEX has adopted a long-term strategy to become a dominant player in the information and communications products and services marketplace. Some of NYNEX ISG's strengths are listed below:

- Because this is a strategic business area for its parent, ISG has received (and will, no doubt, continue to receive) a significant level of investment for both internal development and for acquisitions. This does not mean that ISG is not viewed as a commercial, profit-making undertaking. However, the long-term positioning of ISG will not necessarily be sacrificed to quarter-to-quarter performance targets; the pressure for short-range performance is a problem experienced by some of NYNEX's public company competitors.

- The AGS acquisition brought bulk to ISG, including offices, contracts, and professional resources. It was a similar type of thinking that, in part, prompted IBM to make its 1989 investment in Computer Task Group, one of AGS's competitors.

- ISG is able to offer a mosaic of key products and services to key business sectors:

  - The financial services sector (banking and securities) through BIS, DISC, Inc. and Vista Concepts, Inc.

  - The telecommunications sector through Telco Research, AGS, and NYNEX Development.

- NYNEX's Complex Systems Integration Group (CSIG) contracts and mobilizes NYNEX ISG resources and directs these resources to client needs and develops new systems and network integration platforms.

- NYNEX's CSIG group is well-positioned to focus its SI strategies on the growing number of network integration opportunities and is doing so.

NYNEX ISG has weaknesses; these are intertwined with—in fact, almost mirror images of—its strengths:

- Its parent, NYNEX, is still legally constrained from offering several products and services that would, according to current legal doctrine, take unfair advantage of NYNEX's position as monopoly provider of communications services. The two areas in which constraints most affect NYNEX's position as a systems integrator in the U.S. are:

  - Manufacturing communications or computer hardware
  - Offering on-line remote processing of customers' data

  These constraints have only been a minor hindrance so far. In the longer run, these barriers could create increasing problems if they remained in place; however, one school of thought believes that these legal prohibitions will be reduced or eliminated in the next few years. Since this issue is, to some extent, a political one, it is difficult to say with certainty what the outcome will be.

- A more immediate problem is that the bulk of AGS' work is essentially project-related, rather than being SI in nature. NYNEX's objective is to add increasing amounts of value-added work to AGS in order to raise its capabilities and margins. The danger is that the sheer size of AGS will tend to keep it headed in the same project-oriented direction for some time to come.

- NYNEX has significant presence in the financial services, state and local government and manufacturing vertical markets. However, NYNEX has a much lower level of expertise and more limited product offerings in most other vertical markets. This situation contains two problems:

- NYNEX will find it harder to break into other markets without additional acquisitions.

- If the banking and brokerage sectors should themselves run into financial difficulties, NYNEX could be disproportionately affected.

• The NYNEX SI strategy is dependent on internal and external resources being orchestrated both on an ongoing (strategic) basis and for specific (tactical) SI jobs. This is difficult enough in any multi-divisional organization where different units have their own goals and schedules. This task is even more difficult in an organization that is built up through a number of different acquisitions, each with its own culture and method of operations.

In summary, NYNEX's problems are also its opportunities, and vice versa. That the problems inherent in NYNEX's strategy were evident from the beginning is grounds for optimism about NYNEX's approach. NYNEX has a strong management group that is working to take advantage of its position in the market.

4. Markets Served

NYNEX ISG is particularly strong in the U.S., where INPUT estimates it receives over two-thirds of its revenues. BIS gives NYNEX a well-placed European position in its areas of expertise and has provided NYNEX with a position and operating units along the Pacific Rim.

NYNEX is exceptionally strong in the financial services markets, with its software and services offerings by BIS, Vista Concepts, and DISC, as well as AGS' professional services experience in this area.

Telco Research, NYNEX Development, and CSIG give ISG special telecommunications experience and business entrée.

AGS has manufacturing communications software as well as professional services experience in factory systems; however, NYNEX ISG does not yet have manufacturing sector experience that is nearly as deep as its financial sector experience.

5. Recent Events

As noted above, NYNEX ISG has grown largely through acquisition. Acquisitions are made by NYNEX ISG itself, as well as through its AGS subsidiary, depending on how the acquisition will fit into ISG's overall business.

Examples of this strategy are two 1989 acquisitions by NYNEX's AGS Information Services:

- In July, AGS bought Multiple Technologies, a 200-employee, Michigan-based professional services firm specializing in the discrete manufacturing sector.

- In November, AGS acquired TELO Technologies, previously a subsidiary of Tampa Electric. TELO offers products and services to the utility industry.

This appears to be part of a pattern where small and/or lower value-added acquisitions are folded into AGS, rather than being maintained as separate entities or added to CSIG.

6. SI Organization

NYNEX ISG has 19 operating entities that are organized into seven operating units, as shown in Exhibit NYN-2. The NYNEX Complex Systems Integration Group (CSIG) is the chief vehicle for providing SI services, as its name would imply. CSIG typically serves as a general contractor, calling in resources from the other units of ISG, other parts of NYNEX, other subcontractors, and long-term or single-project partners. Services that CSIG provides are shown in Exhibit NYN-3.

The competencies of the other ISG units are briefly described below:

- *AGS Information Services*—Provides professional services to over 1,000 clients, largely through the design and implementation of custom information systems. AGS has expertise across many functional and vertical areas.

- *AGS Management Systems*—Provides project management software and system development methodologies

- *DISC*—Provides cash management, account reconciliation, and regulatory compliance software to U.S. banks

- *Systems Strategies*—Provides UNIX-to-IBM and VAX-to-IBM communications software

- *Vista Concepts*—Provides securities processing and trust accounting software

- *Eastern Design Company*—Supplies engineering and technical personnel

- *EDC Temps*—Supplies temporary office personnel

- *BIS Banking Systems*—Provides international banking software and services

EXHIBIT NYN-2

NYNEX Information Solutions Group, Inc. Organization

- NYNEX Complex Systems Integration Group
- AGS Computers, Inc.
  - AGS Information Services, Inc.
  - AGS Management Systems, Inc.
  - DISC, Inc.
  - Systems Strategies Inc.
  - Vista Concepts, Inc.
  - Eastern Design Company, Inc.
    - EDC Temps, Inc.
- The BIS Group Ltd.
  - Banking Systems
    - BIS Banking Systems Ltd.
  - Information Systems
    - BIS Applied Systems Ltd.
    - BIS Beecom International Ltd.
  - Marketing Information
    - BIS Mackintosh Ltd.
    - BIS Shrapnel Pty. Ltd.
    - BIS CAP International
  - Direct Marketing
    - Christian Brann Ltd.
    - Contact 24 Ltd.
- The DATA Group Corporation
- NYNEX Computer Services
- Telco Research Corporation
- NYNEX Development Company

EXHIBIT NYN-3

NYNEX Complex Systems Integration Group Services Offered

- Consulting
  - Business strategy
  - Systems and communications needs analysis
  - Information/communications systems planning
  - Technology assessment
  - Equipment and systems evaluation and selection
  - Feasibility studies and RFP evaluation
  - Information/communications systems organization audits
- Systems and Network Design and Development
  - Prime contractor
  - Systems/network design, engineering, and development
  - Hardware, software and network integration
  - Custom software, development
  - Integrated network management systems
  - Systems integration development tools and methodologies
  - Local-area/metropolitan-area networks
- Systems Implementation
  - Project management
  - Contract management
  - Procurement, prototyping, testing
  - Documentation
  - Conversion
- Public and Private Training and Education
  - User skills
  - Technical seminars
  - Executive awareness seminars
  - Development skills
- Systems/Network Operation
  - Facility/network management
  - Technical support
  - Customer support
  - Maintenance
- Systems Re-Engineering
  - Maintenance
  - Redesign
  - Tools

- *BIS Applied Systems* and *BIS Beecom*—Provide professional services in the U.K.
- *BIS Mackintosh, BIS Shrapnel,* and *BIS CAP*—Provide consulting and market information to the information services industry
- *Christian Brann* and *Contact 24*—Provide direct marketing services in the U.K. and Australia
- *The DATA Group*—Provides software and services to customer services organizations
- *NYNEX Computer Services*—Provides professional services and video information services integration
- *Telco Research*—Provides call accounting software and professional services
- *NYNEX Development Company*—Develops new business opportunities. Currently developing products and services in LAN integration, integrated network management, and electronic funds transfer

7. SI Business Objectives

NYNEX's principal business objectives are:

- To obtain profitable business
- To control its account base
- To strengthen its non-SI business

Less important are follow-on hardware sales and follow-on systems operations contracts—which is reasonable, given its current legal constraints. NYNEX ISG is continuing to target a 25% compound annual growth rate and to increase margins. It has been getting half of its SI business from current accounts and half from new accounts.

8. Internal SI Capabilities Evaluation

a. Business Consulting

CSIG offers business consulting directly as part of its front-end value-added services. BIS Applied Systems also offers business consulting as well as BIS Banking Systems in its focused area of expertise.

b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

AGS Management Systems offers a series of software packages for project management as well as a system development methodology. BIS offers the Integrated Programming Support Environment (IPSE) package.

c. Packaged Application Software

Different operating units of ISG offer extensive applications packages, as described in Section 7, above.

d. Packaged Systems Software

Systems Strategies offers the connectivity software previously described.

e. Standard Computer Hardware

NYNEX does not generally offer standard computer hardware. One of the few exceptions is hardware and software from the DataMyte Corporation used in AGS Information Systems' factory data collection offering.

f. Custom Computer Hardware

NYNEX does not develop customized hardware.

g. Network Management and Operations

Given NYNEX's principal business, it is not surprising that network-oriented products and services are threaded into many of the offerings of ISG units:

- CSIG: Integration services
- AGS: Extensive development services
- Systems Strategies: Connectivity products
- Vista Concepts: On-line trading systems
- NYNEX Computer Services: Consulting
- Telco Research: Products and consulting for telecommunications management
- NYNEX Development: Local-area network (LAN) integrated products and services

h. Service and Repair

Services and repair are not offered by ISG but are offered by another NYNEX affiliate, NYNEX Business Centers.

i. Software Maintenance

Maintenance is offered as a standard part of NYNEX's various software products and is offered by the professional services units as a separate service to clients.

9. SI Strategic Alliances

The NYNEX Corporation has many strategic alliances, ranging from telecommunications enterprises (e.g., France Telecom, Northern Telecom, Singapore Telecom) to relations with suppliers of its computer store division.

NYNEX ISG has loose reselling alliances with IBM, DEC, Stratus, and Tandem. None of these are exclusive or particularly close relationships. In Tandem's case, for example, NYNEX was the ninth integrator with which Tandem formed a reselling arrangement (others included BCS, EDS, SHL, SAIC, and GTE). NYNEX also has relationships with the leading on-line transaction processing hardware companies and inter-LATA carriers like MCI, AT&T, Telenet, and Tymnet.

10. SI Capabilities Summary

NYNEX ISG has an exceptionally wide range of products and services that it can marshall under its SI umbrella. In addition, the NYNEX Complex Systems Integration Group can use other parts of NYNEX, subcontract, or form alliances with other vendors to bid and win systems and network integration contracts.

11. Marketing Strategy

NYNEX ISG's marketing strategy is to build on its strong presence, including:

- The NYNEX Corporation's industry, systems, and network experience
- ISG's position in financial services, utility, manufacturing, and state/local government markets
- The market positions of AGS, BIS and Telco Research
- Growing focus on network integration (including complex LANs, metropolitan-area networks (MANs), and network operations management)

Being already strong in these diverse areas will allow ISG and its CSIG unit to directly attack the SI marketplace.

NYNEX's competitors exist on two levels:

- Andersen, CSC, IBM, and EDS for large, complex SI projects
- Computer Task Group and other value-added professional services firms for less complex SI jobs

12. SI Customer Base

NYNEX indicates that since 1987 it has worked on 15 commercial SI jobs with an average contract value of $25 million. NYNEX has not been involved in any significant U.S. federal SI projects, as its focus from the beginning has been on commercial and international markets.

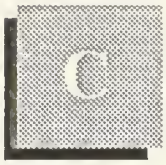
13. Summary and Future Direction

INPUT believes that the near-term future of NYNEX's SI efforts will have these characteristics:

- Focus on contracts with high network integration content
- Further increase in the synergies between the different ISG units
- Selective acquisitions to increase its capabilities in targeted markets

NYNEX is obviously in SI (and information services) for the long haul. Other SI firms should expect NYNEX to be an even more aggressive competitor in the future.

Appendix: Computer Sciences Corporation



Appendix: Computer Sciences Corporation

1. Key SI Contacts:

Federal Systems Integration

Mr. A. E. Nashman
Group President, Systems Group
3160 Fairview Park Road
Falls Church, Virginia 22042

Commercial Systems Integration

Mr. Paul J. Crowley
President, CSC Consulting
5 Cambridge Center
Cambridge, Mass. 02142

Mr. James A. Champy
Senior Vice President, Consulting Group
Cambridge, Mass.

Mr. John M. Thompson
Chairman, CSC European Operations

Corporate (Federal or Commercial)

Mr. Mel Bergstein
Senior Vice President, Systems Integration
5 Cambridge Center
Cambridge, Mass. 02142

2. Description of Principal Business

Computer Sciences Corporation is a nearly pure computer services organization. It manufactures minimal amounts of equipment, primarily specialized communications interfaces in low volume. It promotes itself as a leading systems integrator and software developer. The company also provides specialized proprietary services to markets such as finance, healthcare, claims processing, network management and income tax processing. It provides value-added communications services and remote computing services to private industry and government.

Exhibit CSC-1 includes CSC's revenues for fiscal year 1990, which ended March 31, 1990. As can be seen, the majority of revenues (65%) was derived from federal systems and services.

EXHIBIT CSC-1

Fiscal Year 1989* Revenues by Business Segment

Business Segment	Revenues ($M)	Percent
Systems Group	966.2	65
CSC Consulting	276.0	18
Industry services	258.2	17
Total	1,500.4	100

* Fiscal Year Mar. 31, 1989 - Mar. 31, 1990

In addition to sustained growth in this traditional business area, CSC is making a major thrust to expand its business into the commercial market through its consulting and industry services groups, which represented 35% of its fiscal year 1990 business. These services include consulting and systems development and integration services for commercial, financial, industrial and international clients. Also included are consumer credit, health and insurance processing services, and a segment which provides income tax processing services and turnkey computer-integrated manufacturing systems.

3. CSC Competitive Position

CSC has been very successful with its federal systems and services and professional services businesses, where it has provided requirements analysis, software development, systems engineering and integration, and communications and facilities management, primarily to its major customer, the U.S. federal government. The company has historically had a very high success rate, winning over 60% of bids, although in calendar year 1989, its win rate declined to 57%. It also has a strong base of multiyear mega-contracts, generally contracts with a total value in excess of $100 million, which fuel the company's traditionally strong growth rates. CSC reports that in fiscal 1989 it won eight such awards with total contract values in excess of $1.7 billion, in addition to scores of smaller contracts. In 1990 it did not have its customary success in winning these large "mega-contracts."

CSC had not played a major role in the commercial professional services market before 1987, when it announced a goal of attaining 50% of its profits from commercial business by 1992, based on increasing its commercial revenues to 40% of the total. The company also announced at that time that it had $200 million to spend on acquisitions to augment its existing commercial business. It has made several significant acquisitions to implement this strategy, including Computer Partners, Index Group, CIG-Intersys and others,which will be described in Section 5.

In January 1989, it sold a majority interest in Infonet, its worldwide public network subsidiary, to a group of European and Pacific telecommunications administrations to strengthen Infonet's position as an international communications service.

In 1990, it sold it remaining Infonet interest to MCI. CSC had an extremely successful fiscal 1990, with revenues growing 15%, 22% from continuing operations and net earnings 15%. Its federal revenues grew significantly (11%), despite a fiscally constrained federal market. The non-federal segments of CSC's revenues grew from 29% to 35%, as can be seen in Exhibit CSC-2.

EXHIBIT CSC-2

CSC Fiscal Year Revenues by Major Market

Market Segment	Percent of Total Revenues	
	1989	1990
Federal government	71	66
Commercial	20	21
State and local government	3	3
International	6	10

INPUT believes that a cornerstone of CSC's commercial thrust will be systems integration. It will combine its federal systems integration experience with the consulting and vertical marketing expertise gained through its existing commercial processing services businesses and acquisitions. It can also be expected that CSC will continue to look for acquisition candidates to broaden its commercial capability and geographic coverage.

CSC indicated that its calendar year 1989 systems integration revenues were $400 million, distributed as shown in Exhibit CSC-3.

EXHIBIT CSC-3

CSC Systems Integration Revenues 1988

Business Component	$ Millions
Federal	325
Commercial	75

4. Markets Served

CSC has expertise in tax, credit, health and insurance processing through its processing services offerings. CSC Partners (formerly Computer Partners) provides vertical market expertise primarily in manufacturing, distribution, finance, insurance, retail, publishing, utilities and state and local government. Cleveland Consulting adds depth in consulting in logistics and operations management. CIG-Intersys provides European experience in retail banking as well as in the other vertical industry markets in which CSC claims strength. The company is leveraging this experience by focusing its systems integration activities on the vertical industries identified in Exhibit CSC-4.

EXHIBIT CSC-4

SI Market Focus—CSC

Vertical Industry	Functional
Federal government	Networking
State and local government	Office automation
Distribution	Digital image handling
Retail	
Finance	Facilities management
Insurance	Logistics
Telecommunications providers	
Publishing	
Manufacturing	

Exhibit CSC-4 also identifies specific functional markets that CSC is pursuing. Its focus on these markets is a result of its technology expertise, gained from participating in many large federal programs.

5. Recent Events

In July 1986, CSC acquired Computer Partners (revenues of approximately $15 million), a professional services firm with offices in the northeast corridor. Computer Partners, now known as CSC Partners, has

vertical market expertise in manufacturing, distribution, finance, insurance, utilities, and state and local government.

In October 1988, CSC acquired Index Group, Inc. ($30 million in annual revenues), a leading consulting firm to major U.S. and European companies specializing in the strategic use and management of information technology. This acquisition added a strong senior commercial consulting capability to CSC's strong systems integration credentials.

In April 1989, CSC announced that it would acquire CIG-Intersys, the largest computer services organization in Belgium (1988 revenues of approximately $85 million). CIG also operates in France and the Netherlands, and holds minority ownerships of firms in Argentina and West Germany. It provides consulting, computer systems and network integration, software engineering, software products, and data processing services. CSC already had European operations in the United Kingdom, Germany, the Netherlands and Belgium. This acquisition strengthens its European market position as well as adding specific European vertical market knowledge.

In May 1989, CSC created a separate commercial and international group, called the Consulting Group, which brings together under one organization: CSC Partners, focused on commercial systems development and integration; Index Group, which works with clients on information technology strategies; European operations, including CIG-Intersys; and Communications Industry Services, a software development organization for telephone company needs. This Group is managed by Thomas Gerrity, former Chairman of the Index Group, and is focused on providing commercial and international customers with a full range of information services. This move focuses these organizations, which originally reported independently to the Chairman, under a single management focused on the commercial and international professional services market.

In mid-July 1989, CSC announced that Mel Bergstein, a former senior partner of Andersen Consulting and a well-known and respected industry figure, had joined CSC as a senior executive in the Consulting Group. While with Andersen Consulting, Mr. Bergstein was instrumental in the technical development of development methodologies and products, including FOUNDATION and MACPAC. He was also responsible for the development of a strong sales organization. His reputation and knowledge will assist CSC in future acquisitions, product development, refocusing federal skills and methodologies to commercial markets, and in the overall marketing and sale of CSC's evolving capabilities. This event emphasizes again how serious CSC is about penetrating commercial systems integration. In May, 1990 Mr. Bergstein was given corporate responsibility for systems integration reporting directly to Mr. Hoover.

EXHIBIT CSC-5

Major Recent Developments

- Acquisition of Computer Partners and Index Group
- Acquisition of CIG-Intersys
- Consolidation of commercial professional services
- Key executive appointments

In November 1989, CSC made three additional acquisitions to enhance its commercial capabilities. They were: Cleveland Consulting, LPS Inc., and Intorem Limited.

Cleveland Consulting counsels clients on strategies and effective management of all of the linkages in their supply chain. The activites involved are buying materials and making, moving, and selling products. This Cleveland, Ohio-based firm was purchased from Saatchi and Saatchi when it decided to disband its consulting business.

LPS, Inc. was a privately held professional services firm, based in Minneapolis, which added 140 employees and annual revenues of $9 million in an area where CSC had limited geographic coverage.

Intorem Limited, based in metropolitan London, provides information technology and consulting, and has developed integrated systems for clients in the financial services, retail and leisure industries. It has annual revenues of about $20 million.

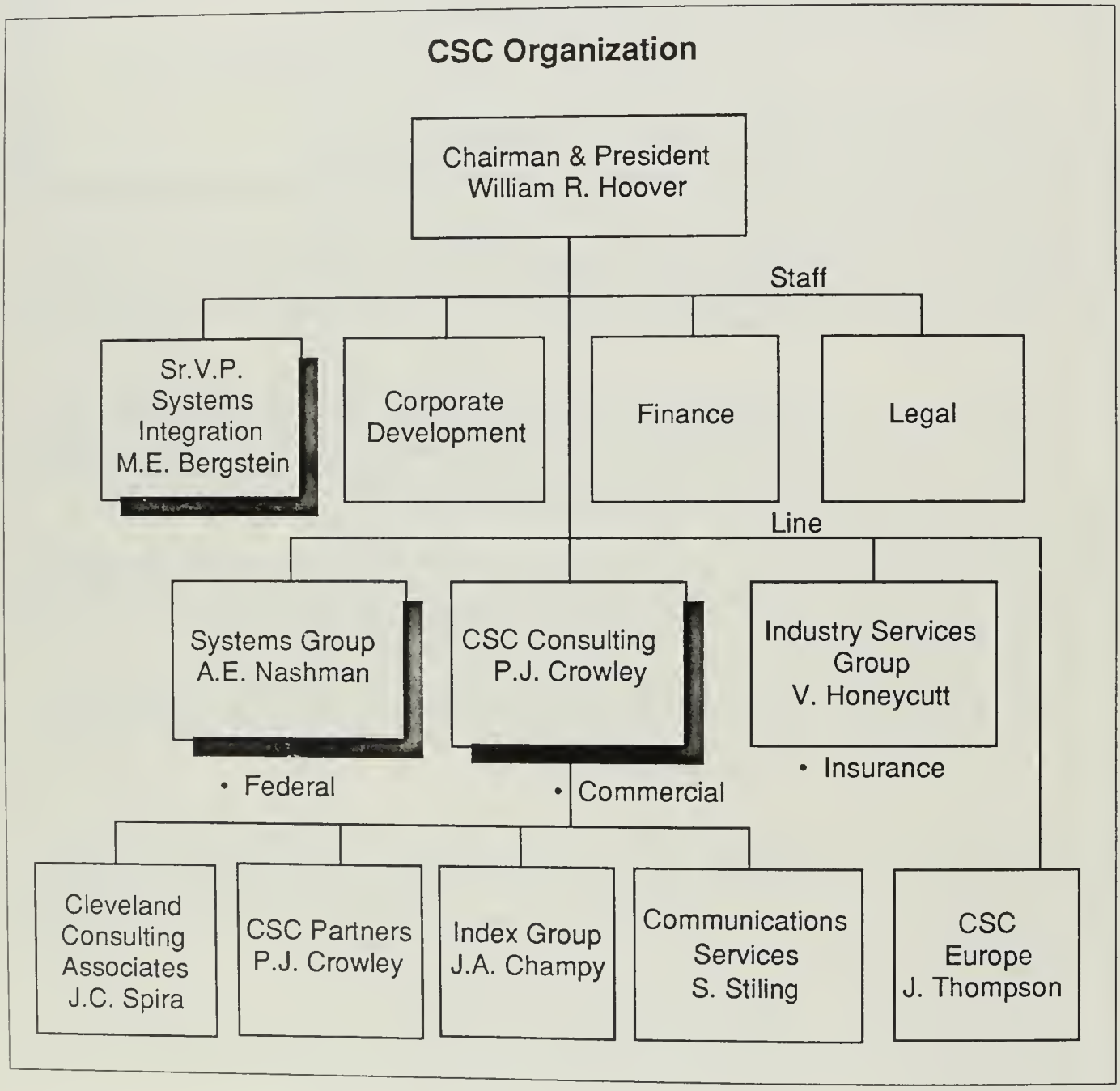
In the first quarter of 1990, CSC acquired Dallas-based LOGIC Inc, a closely held firm providing financial insurance software and services. LOGIC's software systems administer life and disability insurance for credit loans and mortgages insurance for warranty and mechanical breakdown and collateral protection insurance.

In the first quarter of 1990, CSC also signed an alliance with Digital Equipment Corporation to pursue systems integration business in the distribution and logistics marketplace, as well as integration opportunities within the telecommunications industry.

6. CSC Organization

The CSC organizations that are involved in systems integration are highlighted in Exhibit CSC-6.

EXHIBIT CSC-6



SI resources are distributed across three major organizations consisting of a number of divisions and companies. Federal systems integration activities are the responsibility of Alvin Nashman, Group President, Systems Group. Commercial systems integration activities are the

13. Summary and Future Directions

It is clear that CSC has set its sights on becoming a major player in commercial systems integration, and is making significant investments to reach this goal. It has carefully selected and acquired firms that will help it achieve this goal. INPUT believes CSC's strategy, which is built around strategic consulting provided by the Index Group and its solid federal project management skills, is sound. It provides unique commercial consulting experience as well as access to a commercial client base—both capabilities that federal integrators generally lack.

Its string of carefully selected acquisitions provide it with the bridge that is necessary to convert federal experience and skills to commercial application implementation. However, CSC may not yet realize quite how difficult this step is. The recent appointment of Mel Bergstein shows how serious CSC is about commercial SI, and he may be the necessary ingredient in making the transition from federal to commercial markets, and in broadening CSC's commercial marketing capabilities.

INPUT believes that CSC will continue to acquire commercial firms that expand its geographic and vertical industry coverage. On the whole, CSC's strategy seems sound.

switched network has 21 backbone nodes, and by the mid-1990s will serve 7,500 locations worldwide and over 65,000 terminals.

- Kennedy Space Center—CSC is the prime contractor responsible for NASA/KSC's office automation system. This system supports all secretarial, professional, and management staffing at KSC.
- Wierton Steel—This five-year project, called IMIS (Integrated Manufacturing Information System), is focused on providing superior customer service through improved inventory control and scheduling and other state-of-the-art manufacturing techniques.
- Massachusetts Water Resources Authority—This project involves the implementation of a major information system to monitor and control the progress of the large capital projects that the Authority will be implementing over the next several years to improve water and sewer systems in 60 communities.

EXHIBIT CSC-11

Examples of CSC's Customers & Contracts

Company/Industry	Project Description
Dade County Airport	Automated Cargo Information System
U.S. Air Force	Stock Control and Distribution
Cincinnati Gas and Electric	Customer Services System
AT&T	Trunk Inventory and Control System
U.S. Treasury Department	Consolidated Data Network
Kennedy Space Center	Office Automation System
Major Steel Firm	Manufacturing Information System
Massachusetts Water Resources Authority	Capital Projects Information System

strategic solutions that provide competitive advantage, and addressing mission-critical applications. This capability that Index Group provides is critical to CSC's marketing strategy, as it does not otherwise have access to a large commercial customer base or a large commercial sales force.

From an implementation point of view, CSC's credentials are extremely strong, as it has its federal skill base, CSC Partners, CIG-Intersys and its other acquisitions to call on. As other federal integrators have recognized, CSC will have to train its people to interact effectively with commercial customers, and to modify its federal implementation practices in order to work effectively in a commercial environment. CSC has, and continues to carefully select, acquisitions and partners to assist in this transition.

12. SI Customer Base

A number of the projects that CSC has won and is implementing are listed in Exhibit CSC-11. They are:

- Dade County Airport—As prime contractor, CSC has been responsible for the automated cargo information system for the airport and seaport of Miami, Florida. Responsibilities include design, implementation, integration, and facility management of the system, including software, communications equipment, and user procedures. The system connects 20 airlines, 15 brokers/forwarders, and the required federal agencies.

- U.S. Air Force—As prime contractor, CSC is providing systems integration services for the Air Force's new Stock Control and Distribution system. CSC's deliverables include the teleprocessing to support transportation and depot processing, retail and maintenance operations, inventory control points, and depot management.

- Cincinnati Gas and Electric—CSC is participating in all phases of the development of a new on-line customer service system that includes subsystems for order entry and tracking, billing, and financial records processing.

- AT&T—CSC maintains, enhances, and develops the circuit provisioning system used nationwide by AT&T to issue and track service orders, maintain an inventory of equipment and facilities, and design long-distance circuits.

- U.S. Treasury Department—CSC is the prime contractor for the design, integration, implementation, and operation and maintenance of the Consolidated Data Network which meets the needs of the various departments of the Treasury. At this date, the major user is the U.S. Customs Service, with the IRS just beginning to phase in. The packet-

EXHIBIT CSC-9

CSC's major weaknesses in the commercial market are its lack of commercial marketing experience and geographic sales and implementation coverage.

CSC Competitive Status

Strengths	Weaknesses
Federal SI experience	Geographic coverage
Technical strength	Commercial sales organization and experience
Product vendor independence	
Business consulting skills	

11. SI Marketing Strategy

CSC's commercial systems integration strategy is now focused in CSC Consulting and CSC Europe, as indicated in exhibit CSC-10.

EXHIBIT CSC-10

The marketing strategy appears to be built on leveraging the Index Group's strategic consulting reputation and programs. The Index Group has provided high-level education and consulting to both U.S. and European clients. It has a reputation for providing excellent client support in identifying strategic information systems requirements, developing

CSC SI Marketing Strategy

- Focus commercial growth on CSC Consulting and CSC Europe
- Focus on strategic consulting, then implementation
- Leverage federal experience
- Build on Partners' and CIG-Intersys' commercial experience

g. Service and Repair—CSC offers system service and repair only as part of its remote processing and network services, or ancillary to its systems integration contracts.

h. Software Maintenance—Since CSC provides limited software products, it has limited software package maintenance capability.

9. SI Strategic Alliances

CSC has historically not made a conscious effort to publicize a broad set of alliances. It believes that development of these alliances would cast doubt on its ability to be truly independent in developing the best solutions for its customers. In its federal SI efforts, CSC has worked with most of the major hardware and software vendors in teaming or prime contractor/subcontractor relationships. The company feels comfortable that it can develop and work whatever relationships are necessary to meet its prime contractor responsibilities.

During late 1989, CSC did begin to announce formal alliances, the first with SP America to market vertical industry solutions, primarily in manufacturing and distribution-related industry segments. In early 1990 it announced an alliance with Digital Equipment to pursue SI opportunities in distribution, logistics and telecommunications.

Among its many relationships, of particular note are those with AT&T and IBM. AT&T is a major CSC customer and CSC has developed a number of projects for and with AT&T, including the major U.S. government communications contract, FTS-2000. CSC has worked with IBM on a variety of programs, the largest being the recent $3.5 billion FAA award.

Overseas, CSC announced last year a five-year joint marketing agreement with British Telecom.

10. SI Capabilities Summary

Exhibit CSC-9 identifies CSC's major strengths and weaknesses. As a candidate in the commercial SI arena, it has strong experience and technical capabilities. It has a reputation in the federal market as an aggressive competitor and competent integrator. It has broad and strong technical and management skills. It is not committed to a single vendor's hardware and/or software products and, as a result of its recent acquisitions, now has commercial strategic consulting skills and enhanced vertical industry knowledge and experience.

8. Internal SI Capabilities Evaluation

CSC's experience, its strong set of technical skills, and its success in federal systems integration positions it well to participate in the commercial SI market. In addition, through acquisition and its processing services activities, it has a base of commercial skills. Brief descriptions of the individual SI capabilities are given below:

a. Business Consulting—These skills, once limited to federal applications, have been expanded to the commercial market through the acquisition of a premier consulting organization, Index Group. The acquisitions of Computer Partners Cleveland Consulting, CIG-Intersys and other firms also strengthen this area.

b. Design Methodology—CSC has been known traditionally as a competent and capable designer of information solutions. It has and uses CASE products to support its design methodology.

c. Design and Integration, Project Management, Software Development, and Education, Training and Documentation—CSC has been strong in these areas and should be able to transfer these capabilities to commercial opportunities effectively.

d. Packaged Application Software—CSC's primary application software offerings are provided through its Industry Services Group. It had marketed a turnkey system called MAN-FACT II to discrete manufacturers, but sold it in March 1989. CSC also has developed industry-specific software for insurance and tax processing. Its purchase of Logic Inc. strengthens its insurance offerings.

e. Packaged Systems Software, Standard Computer Hardware and Custom Computer Hardware—Computer Sciences manufactures no computer hardware, nor does it develop systems software products. It prefers the flexibility of being able to select the products that are best suited to meet the needs of the current systems problem and that will provide the best solution.

f. Network Management and Operations—CSC has strong network management and operations capability as a result of experience developed through its remote processing businesses, its worldwide Infonet network, and the building of private data networks for the U.S. government. It has participated successfully in large federal network contracts such as the U.S. Treasury and FTS-2000. It is interesting to note that it often works closely with AT&T; announcement of a formal relationship with AT&T has been rumored in the past.

EXHIBIT CSC-8

Centralization/Decentralization of SI Business Functions

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	B
Marketing and promotion	C	C
Contract review/approval	B	C
Account management/sales	D	D
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	D	D
Systems operations	D	D

(C=Centralized, D=Decentralized, B=Both)

7. SI Business Objectives

CSC is clearly focused on systems integration as a means of changing its revenue and profit mix. As mentioned earlier, CSC's primary objectives for SI are revenue and profit growth, particularly in commercial SI. Commercial SI expansion will be driven by corporate business objectives that include 40% of revenues and 50% of profits being derived from the commercial business. CSC recognizes that industry is looking for business and information consulting and business solutions, and has established a primary objective of responding to these customer demands. Secondary SI objectives are control and expansion of its account base, and developing a follow-on facilities management business. The company's objectives do not include significant, if any, hardware or software sales.

responsibility of Paul Crowley, President of CSC Consulting, and are carried out in CSC Partners, Index Group, Communications Services and Cleveland Consulting. The third organization, headed by John Thompson, has responsibility for developing CSC's European presence. Mel Bergstein, Corporate Vice President of Systems Integration, provides staff focus and guidance for systems integration, pursues corporate-to-corporate alliances, and has responsibility for large account development.

CSC has an SI staff of over 3,000—2,000 of whom are focused on federal work and more than 1,000 on commercial.

Exhibit CSC-7 is an estimate of how the SI personnel are distributed among functional activities. There is a strong professional services content, with 85% of the resources allocated to project management, systems development and implementation, hardware and software evaluation, and acquisition and hardware engineering.

EXHIBIT CSC-7

CSC Distribution of SI Personnel

Capability	Percent
Management, strategy & planning	5
Legal support/contract administration	5
Project management	15
System development/implementation	50
Hardware/software evaluation/acquisition	15
Hardware engineering	5
Sales	5

CSC has a similar organization philosophy for both federal and commercial SI activities. As indicated in Exhibit CSC-8, most implementation activities are decentralized, though marketing and promotion are done centrally. Strategy and long-range planning are a joint activity with both line and headquarters participation. Account management and sales are performed centrally for federal SI and are both centralized and decentralized for commercial SI.

Appendix: Andersen Consulting

Appendix: Andersen Consulting

1. Key Contacts

George Shaheen
Managing Partner
Andersen Consulting
69 West Washington Street
Chicago, IL 60602

2. Description of Principal Business

Arthur Andersen & Company (AA), organized as a partnership, is one of the "Big Eight" public accounting firms. In addition to offering world-wide accounting/auditing/tax services to client firms, AA offers through Andersen Consulting (AC), formerly the Management Information Consulting Division, related services including:

- General Management Consulting
- Information Systems Consulting
- Packaged Applications Software for Accounting
- Packaged Software for Vertical Markets
- Integrated Solutions to Business Needs
- Organizational Change Management Services

Arthur Andersen has offered management consulting services since 1948 and information services-related consulting since the early 1950s. Arthur Andersen derives $1.4 billion of its total revenue from consulting services. This segment of the business, with a growth rate of over 30% per year for the last four years, is rapidly becoming the dominant influence on the firm's future strategy.

Of the total revenue stream attributed to Andersen Consulting, approximately 30% can be attributed to pure professional services contracts, 65% from systems integration, and the remaining 5% to applications and systems software products. INPUT's estimate of the detailed breakout is contained in Exhibit AC-1.

EXHIBIT AC-1

Key Parameters Of Andersen Consulting's Consulting/SI Business

Parameter	U.S.	Total
IS practice revenues	$800 M	$1,443 M
IS practice personnel	11,000	18,000
Systems integration revenues	$560 M	Unknown
Systems integration practice personnel*	7,150	Unknown

*Calculated by INPUT.

Arthur Andersen has been one of the most phenomenal knowledge-related businesses of the last 20 years. Revered at one moment by its competitors in the information services marketplace, and not taken seriously at others, the consulting operation has consistently shown significant growth rates and defeated the competition on a regular basis. Its commitment to the information services market has resulted in significant developments over the past several years.

In the 1986-1987 time period, a number of senior consulting partners approached Duane Kulberg, AA's former CEO, to lobby for a change in the structure of the firm that would facilitate the growth of the consulting side of the business. They argued that the traditional "partnership" structure with practice office accountability was inappropriate to a business with an increasing national and international focus. The result was the organizational change that created Andersen Consulting.

In 1987, the consulting partners in local offices began to report through a parallel line of management of area and national consulting partners. At a national level, the consulting practice still reported to the Arthur

Andersen practice head in that country—more often than not, with a background of audit. At the same time, a strengthened dotted-line relationship was created between the country consulting heads (or area consulting heads in the U.S.) and the Consulting Managing Partner in Chicago. This move has strengthened the consulting practice significantly.

3. Andersen Consulting Competitive Position

Number one among the "Big Eight," AA is the largest public accounting firm in the U.S. Its estimated $880 million revenue in IS consulting makes Andersen Consulting the leader among accounting/auditing/consulting firms in this segment.

Andersen Consulting's strengths include contacts at the vice-presidential or presidential level at customer companies. In fact, each IS partner is expected to be able to contact senior officers at their top accounts. In addition, Andersen Consulting offers extensive in-house staff training and has a strong services-oriented culture. AC has developed a variety of strong third-party hardware vendor relationships to support it in its information services consulting business.

INPUT does not believe that AC has any significant weaknesses. However, some problems do exist. First, AC's partnership culture has traditionally worked against change. However, recent developments within the organization are likely to minimize the effect of this problem. Second, AC's approach to systems integration has been heavily business-process-oriented. Top down in nature, the approach is not suitable for every client. Finally, AC's strengths in the international component of the IS/SI market have significantly lagged behind the U.S. operation's. However, AC is rapidly building these capabilities. Exhibit AC-2 summarizes INPUT's assessment of competitive strengths and weaknesses as they apply to the systems integration business.

EXHIBIT AC-2

Andersen Consulting's Competitive Status

SI Strengths	SI Weaknesses
High-level client contacts	Partnership culture
In-house training capability	Process orientation
"Professional services culture"	Foreign SI capabilities
Strong third-party relationships	

4. Markets Served

Andersen Consulting's systems integration business focuses almost exclusively on vertical markets, but in effect covers almost all of the commercial sectors, including:

- State and local government
- Manufacturing
- Wholesale and retail distribution
- Financial services
- Health care
- Insurance
- Utilities
- Process manufacturing
- Transportation
- Telecommunications
- Energy and gas

Although AC has clearly demonstrated capability in all the markets listed, from a historical perspective INPUT believes that AC's primary focus in these vertical industries in order of importance has been: manufacturing, distribution, state and local government, financial services, and telecommunications.

Furthermore, although many competitors consider Andersen Consulting "invisible" in the federal SI marketplace, AC has recently placed significant emphasis on developing business in that arena. Most likely, the "invisibility" is more a function of the types of systems it does—primarily administrative as opposed to the more-publicized defense contracts.

5. Recent Events

A number of significant events have impacted Andersen Consulting's position in the SI market over the past three years.

- AC has placed significant emphasis on the development of alliances in the software community, including: UCCEL/CAI, Management Science America (MSA), McCormack & Dodge, IBM, and SAP (West German cross-industry financial packages).

- On the hardware side, alliances have been formed with IBM, Intel, DEC, Hewlett-Packard (HP), Sun Microsystems, Texas Instruments, Wang and Motorola. In February of 1988, AC and Aetna Life & Casualty signed a joint development and marketing pact for investment accounting software running on DEC/VAX hardware.

- AC has also focused on the development and aggressive marketing of its own software products, including: FOUNDATION (Software Development Utility), DCS/Logistics (Distribution Control System), FIN-PAC (Financial Planning & Control), and the "MAC" line of integrated manufacturing software packages.

- Andersen Consulting also has developed a number of relationships with preferred installers that provide vertical industry software which AC customizes and includes in SI projects.

- Andersen Consulting made a number of acquisitions during 1989.

Acquisitions include the following:

- In September 1989, Andersen Consulting acquired Rossmore Warwick, a 25-30 person British engineering firm that helps design new factories and new process lines.

- In July 1989, Andersen Consulting acquired Courseware, Inc. of San Diego (CA). Terms of the acquisition were not disclosed.

  - Courseware provides computer-based training and training support services to clients in insurance, data processing, communications, real estate, defense, aerospace, and travel, as well as state and federal government. The company had 60 employees at the time of the acquisition and 1988 gross fees of $5.2 million.

  - The operations of Courseware have been merged into Andersen Consulting's Change Management Services (CMS) practice.

- In January 1989, Andersen Consulting acquired McCormack & Dodge's PIOS manufacturing resource planning system. McCormack & Dodge employees who had worked on PIOS development and marketing were offered positions with Andersen Consulting. Terms of the purchase were not disclosed.

  - With an installed base of 75 sites, PIOS is used by a number of large defense contractors.

  - The transaction is part of an agreement between McCormack & Dodge and Andersen Consulting under which the two firms will jointly sell McCormack & Dodge's Millennium financial and human resources software and Andersen Consulting's MACPAC family of manufacturing software products.

- Other 1989 acquisitions include:

  - Computer Management Associates, a consulting firm in Oslo (Norway)

  - Synerlogic, a Canadian consulting firm

  - CMC Consultores, a Spanish consulting firm

But perhaps the most significant developments for Andersen Consulting have been in the ongoing saga of its restructuring to support the information services and systems integration marketplaces. As discussed earlier (Section 2), the formation of Andersen Consulting represented an important change in the firm's outlook on the consulting/IS/SI business.

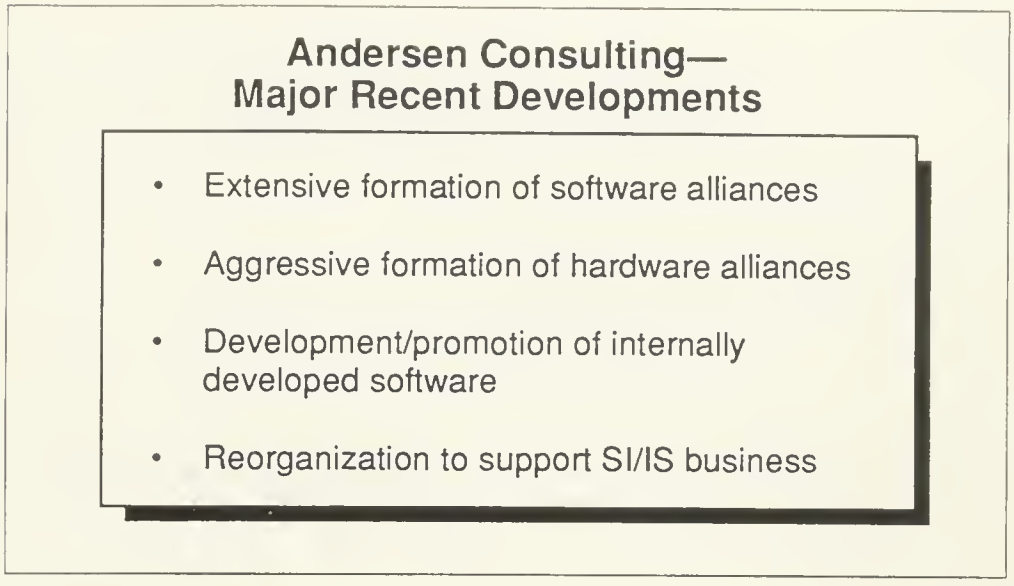
Andersen's growth has not been painless. During the last two years, a number of key systems integration management personnel have left to start new companies or strengthen competitors.

In 1988 several senior partners departed Andersen Consulting to form another firm, Information Consulting Group, financed by Saatchi and Saatchi. Though this venture was not successful, and has since been purchased by McKinsey and Co., it drained Andersen's technical and management talent.

In 1989, Mel Bergstein, a senior Andersen Consulting partner, joined Computer Science Corporation (CSC) and has become Senior Vice President of systems integration. A number of additional key partners joined him at CSC.

Exhibit AC-3 summarizes major recent events impacting Andersen Consulting's position in the SI marketplace.

EXHIBIT AC-3



6. SI Organization

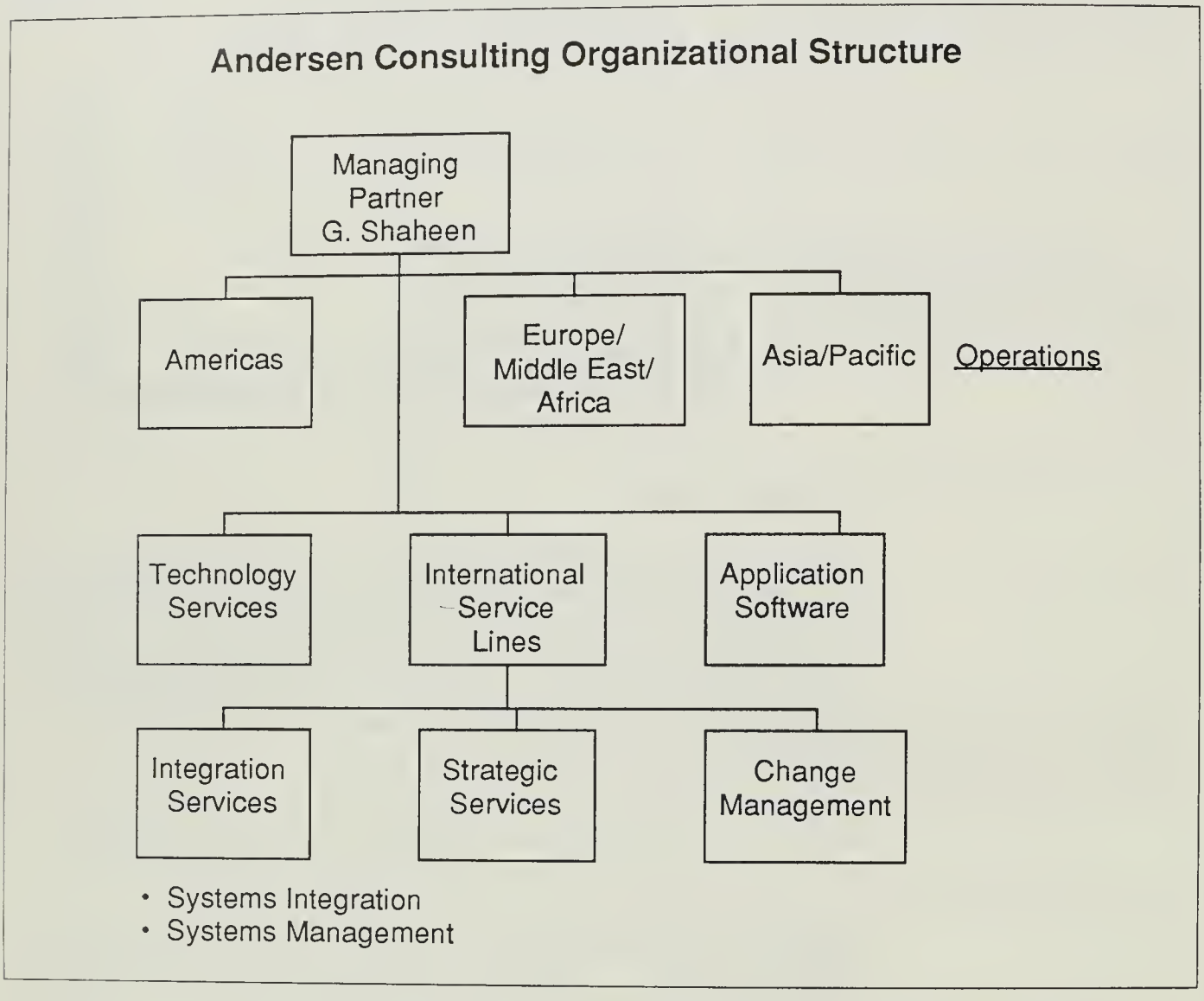
Andersen Consulting manages and delivers its services through the matrixed structure depicted in Exhibit AC-4. The organization is headed by George Shaheen. Reporting to him are managing partners with operational responsibility for three major geographic areas: the Americas, EMEA (Europe, Middle East, and Africa), and the Asia and Pacific area. These partners have responsibility for delivering all of AC's services to their clients.

Also reporting to Mr. Shaheen is a managing partner of international service who has responsibility for establishing strategies and plans for each of AC's major services—integration and change management.

Strategic Services assists clients in forming and managing their, strategic planning processes. Included are services that analyze the client's marketplace and competitive position, identify strategic alternatives, establish a formal direction and monitor the execution of strategies.

The Change Management Services practice works with organizations to position people, processes and technology for maximum continuous benefit. These services focus on organizational structure, knowledge transfer and the integrated use of technology. Integration services includes two major components—systems integration and systems management. System integration includes the full range of development and integration activities; system management includes facilities management and remote processing. By including these two activities in a single organization, Andersen Consulting provides complete life cycle development and operations services.

EXHIBIT AC-4



Two additional areas that report to Mr. Shaheen are Technology Services, responsible for technical excellence (including products such as FOUNDATION) and Application Software, responsible for building and maintaining Andersen's application software package.

Based on INPUT's interviews with Andersen Consulting, responsibilities are distributed in accordance with Exhibit AC-5, which compares how major responsibilities are managed within the commercial and federal organizations, respectively. A "C" indicates that the responsibility for the activity in question is primarily centralized, a "D" means decentralized, and a "B" indicates that the responsibility is shared by both.

EXHIBIT AC-5

Centralization/Decentralization of SI Business Function Andersen Consulting

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Account management/sales	D	D
Contract review/approval	B	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations (if applicable)	D	D

C = Centralized, D = Decentralized, B = Both

Centralized groups handle marketing, bid preparation, risk management, insurance, national contract purchasing, and other activities. Local offices provide the sales emphasis and many of the technical professionals necessary for systems integration projects.

Andersen Consulting has established a number of System Operations Technology, and Business Centers to support its activities.

- There are five Systems Operations Centers, which are large mainframe computer facilities staffed with project teams to run the day-to-day computer operations for an organization. These centers are located in Chicago, Dallas, London, Manila, and Stamford (CT).

- Advanced Technology Centers are staffed with technical experts and project managers who use workstations and network PCs connected to these centers for the automation of the application development process for clients. Advanced Technology Centers are located in Chicago, Dallas, Madrid, and Stamford (CT).

- Andersen Consulting currently has three sites for its Business Integration Centers which specialize in industry- and function-specific technology. These centers serve as facilities where industry project teams from around the world build and demonstrate visions of the future through full-scale working technology exhibits (e.g., a factory floor or hospital of the future).

  - Business Integration Centers are located in Chicago, Dallas, and Atlanta, with planned sites in New York, Los Angeles, Houston, Sao Paulo, and Tokyo.

  - At one Business Integration Center, Andersen Consulting has designed a minifactory (located in Chicago, IL) that displays CIM techniques. The minifactory integrates the products from 35 different companies and produces an aluminum casting that holds a printed circuit board and plastic connectors.

  - Other technologies include expert systems, voice recognition, vision systems, Ethernet and MAP 2.1, personal workstations, touch screens, computer-aided design, computer-aided manufacturing, MRPII, group technology, robotics, material handling, cell control, computer numerical control, and bar code data collection.

  - A second Business Integration Center, also located in Chicago, contains SMART Store 2000, a showcase of Andersen Consulting's vision for the food store of the future: Super Marketing through Applied Retail Technology. The exhibit incorporates state-of-the-art hardware and software applied by more than 20 participating vendors and addresses food industry management concerns about the future.

  - Another Business Integration Center, Hospital of the Future (HotFut), represents Andersen Consulting's vision of the systems technologies that will support the health care delivery system of the 1990s. Located in Dallas, the exhibit will serve as a permanent site for Andersen Consulting and more than 20 participating vendors.

  - Also located at the Dallas Infomart are The Retail Place and the IDEA CENTER. The Retail Place is Andersen Consulting's fully operational Quick Response retail store. The exhibit demonstrates how Quick Response establishes new business strategies, relationships, and procedures to speed the flow of information and merchandise between retailers and manufacturers. The IDEACENTER is a working factory that shows manufacturing automation from order entry through distribution.

Andersen Consulting reports a full-time worldwide IS practice staff of 18,000. INPUT estimates that 7,150 of the 11,000 individuals involved directly in the U.S. information systems consulting practice are directly involved in the SI practice. This number is based on the percentage of 1989 U.S. systems integration revenues. Exhibit AC-6 gives an indication of the distribution of resources between various SI-related activities.

EXHIBIT AC-6

Distribution of SI Business Personnel— Andersen Consulting

Capability	Percent
Management, strategy, planning, marketing	1
Legal/contract administration, finance	1
Project management and administration	5
Design/development/implementation	83
Hardware/software evaluation/acquisition	5
Hardware engineering	1
Sales	4

7. SI Business Objectives

Andersen Consulting wants to gain and maintain position by being the preeminent provider of solutions to "top" organizations worldwide. The focus is strictly on partnering to provide solutions. Although not explicitly stated in the interview process, INPUT believes that Andersen Consulting sees itself as taking leadership as the "respected consultant/ provider of strategic information systems."

From a business perspective, Andersen Consulting sees the revenue and profits from systems integration as a primary motivator for development of the business, along with control of account base and the need to respond effectively to existing and new customer demand. As would be expected, "dragging" hardware and follow-on facilities management

contracts are not of primary interest, although the latter becomes of increasingly more importance as competiton with IBM and EDS becomes more intense.

8. SI Capabilities Evaluation

And as might be expected, Andersen Consulting has a full in-house capability at the high end of the development life cycle, and also as might be expected, makes heavy use of alliances in the areas of systems software, hardware, custom and communications hardware, and hardware maintenance. A summary of its capabilities follows:

- Business Consulting, Design, and Project Management—Clearly this is the area of Andersen Consulting's strength. The combination of a solid methodology along with uniform and effective training of its personnel produces consistent, if not always exceptional results. Consistent with the professional services orientation of the firm, education, training, and documentation are also significant skills that it markets heavily as part of its capabilities.

  It is interesting to note, but not surprising, that Andersen Consulting indicated that it uses no alliances in these capability areas. It should be noted, however, that its recent acquisition activity, particularly in the non-U.S. includes a number of consulting firms.

- Packaged Applications Software—This is clearly an area of strength for AC. It has made significant investments in the development of numerous packages. (See Section 5 and Exhibit AC-7.) The aggressive marketing of these packages, along with the development and utilization of strong alliances to fill the gaps, gives Andersen Consulting a very strong position within its competitive group in the applications software area.

- Systems Software/Computer and Communications Hardware—This is an area where Andersen Consulting consistently utilizes other vendors' products, most often through alliances. AC wants to be perceived as, and most likely is, unbiased in its selection of hardware and systems software.

- Network Management/Operations—Although AC does have some contracts in which it performs these functions, this area is neither a primary focus of business nor an area of strength. Again, AC uses alliances for this function when possible or appropriate.

INPUT believes that overall, Andersen Consulting has significant capabilities in the areas that are most important for winning and executing SI contracts. Its focus on the top end of the life cycle and perceived strengths in understanding business solutions in many industry sectors gives it an edge on the market that few others have.

EXHIBIT AC-7

Andersen Consulting— Applications Software Products Some Examples

Product	Description
MACPAC/CIM	MRPII product linking plant automation and manufacturing software. Several other MACPAC packages run within this series for specialized applications such as defense contracting.
DCS/Logistics	Manages customer service and logistics functions.
CQMS	Cost Quality Management System—integrates clinical and financial data in the hospital environment.
FOUNDATION	A comprehensive set of packages to manage the system's life cycle, which includes submodules METHOD/1, DESIGN/1, and INSTALL/1.
PIOS	(Production and Inventory Optimization System) On-line manufacturing control system acquired from McCormack & Dodge.

9. SI Strategic Alliances

Andersen Consulting has established some significant alliances that strengthen the firm's SI capabilities. As with most other major systems integrators, AC utilizes both long-term and project-by-project alliances. AC believes that the use of alliances supports its strategy for SI by:

- Providing hardware at competitive prices
- Giving it early access to new technologies
- Providing assistance in financing projects

- Supplementing areas where it has limited internal capability, such as maintenance support

The majority of its longer-term alliances have evolved from working with particular subcontractors or partners on a repetitive basis. Other alliances have developed as a result of Andersen's strategy to develop industry-specific software.

The alliances with hardware manufacturers—Hewlett-Packard, for distribution and marketing applications, and IBM—effectively support AC's thrust into financial and manufacturing markets. AC works with DEC as well. Exhibit AC-8 provides examples of AC's strategic alliances in systems integration.

EXHIBIT AC-8

Andersen Consulting—SI Strategic Alliances (Limited Sample)

Product	Description	
Hardware	IBM Hewlett-Packard Intel DEC	Sun Texas Instruments Wang Motorola
Applications Software	UCCEL/CAI MSA McCormack & Dodge SAP (Financial) Inference Corporation	IBM American Software
Systems Software	IBM AION (Expert Systems)	
Cooperative Marketing	Aetna (Insurance)	

10. SI Capabilities Summary

Andersen Consulting's strengths far outweigh its weaknesses as a systems integrator. In fact, its strong set of capabilities in the high end of the life cycle serves to reduce significantly its dependencies on outside suppliers for the high-risk elements of most SI contracts. Its strengths in software development, project management, and packaged systems and

applications software have contributed measurably to the firm's success. The weaknesses in service and repair and, to some degree, design integration, are not critical to success in the business, particularly in the vertical markets where Andersen Consulting has focused.

AC's alliances and applications software offerings also add significantly to its overall capabilities. AC's MACPAC/CIM (Integrated Manufacturing) and DCS (Distribution Control System) are good examples of the latter. And, the FOUNDATION development and implementation methodology is probably the best-known package of its type in the industry.

Finally, Andersen Consulting has always placed heavy emphasis on training. Utilizing its internal training and development capabilities, Andersen Consulting has adopted a strategy of consistent development of its staff. Therefore, AC professional personnel understand the processes used in acquiring and executing the business and can be deployed in the organization when and where needed. The resulting consistency from understanding the approach facilitates the effective deployment of personnel in SI efforts and is a great asset.

11. SI Marketing Strategy

The backbone of Andersen Consulting's marketing approach is its vertical business focus and business process orientation (See Section 4). The process is targeted at developing high-level business solutions and converting them into the application of information technology. AC was one of the first, and clearly is one of the most successful, systems integrators to approach the "strategic systems" market. The AC "process" is at the heart of each project. AC understands the value of developing relationships with high-level managers in target firms and industries and very effectively utilizes referral selling at these levels. AC's demonstrated capability of dealing with projects over $50 million makes it one of the few commercial systems integrators that can make that claim.

In addition, as part of its marketing process, AC has developed and utilizes five Advanced Systems Centers which feature its product offerings. The Evanston, IL center for CIM and JIT manufacturing environments could be considered a "showcase" example. INPUT believes that more of these centers are in process and that they have proven to be very effective in marketing to systems integration prospects.

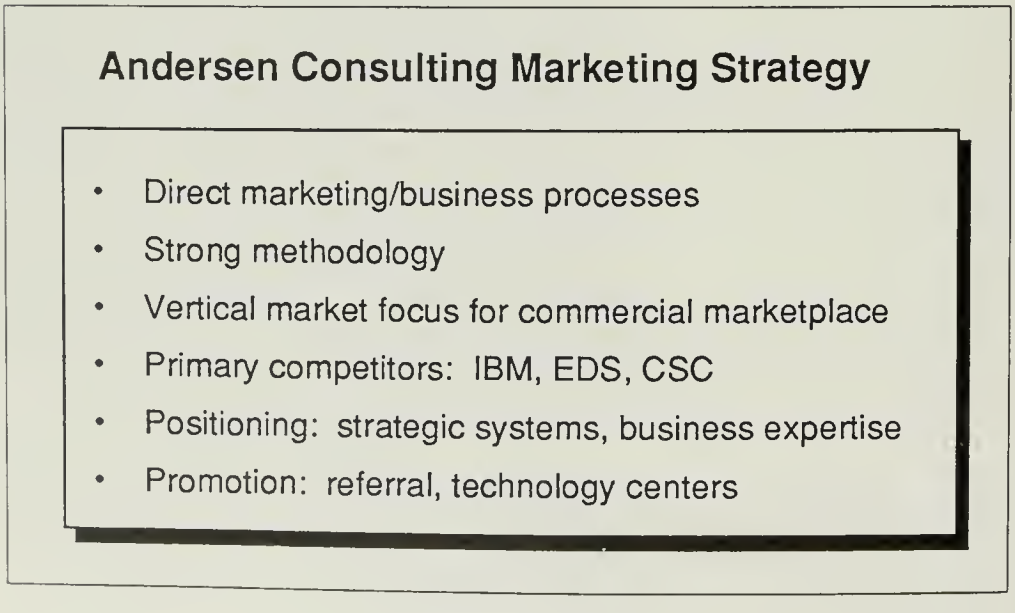
- Competitors: Andersen Consulting sees IBM and EDS as its prime competitors. In the federal marketplace, it adds CSC to that list. As AC broadens its targets to smaller systems opportunities, it will undoubtedly find a few more competitors.

- Positioning: AC's primary positioning with customers/prospects is to promote its ability to apply technology to effect change. AC uses this consistent theme in combination with its in-depth vertical industry expertise to present itself as the number-one seller of business solutions. AC has invested heavily in recent years in developing its technological expertise. Though this is still not a primary positioning point, it certainly plays a role when presenting the entire package to the customer. INPUT believes these capabilities will become more significant in the future.

- Promotion: Andersen Consulting uses essentially all forms of promotion for its SI market strategy, even network television. However, AC indicates that the jury is out on all approaches except qualified client referrals, direct marketing, and utilization of the Advanced Technology Centers, which it rates as highly effective. In addition, AC utilizes public seminars with some degree of success.

Finally, INPUT believes that Andersen Consulting enjoys a somewhat unique marketing position among leading systems integrators which is worthy of comment. AC frequently "writes" the RFP, at least in the figurative sense. AC's business consulting skills often give it entry to the prospect's environment long before a solution or even, at times, the problem, has been defined. Operating from a high-level position as a consultant and supported by the FOUNDATION methodology, AC has often closed the business before it has been opened. As a full-service provider, AC is a logical selection for implementor once the consulting is done. Exhibit AC-9 summarizes Andersen Consulting's marketing strategy.

EXHIBIT AC-9



12. SI Customer Base/Specific Projects

Andersen Consulting reports that about 80% of its commercial systems integration clients come from its existing account base and about 20% from new prospects specifically solicited for SI. In the federal marketplace, the split is 50% from each source. Undoubtedly, the high percentage of repeat business in the commercial market reflects AC's long-term account relationships with larger firms, while the 50/50 split in the federal market is indicative of its more recent entry into that marketplace and the fact that the federal market is more RFP-driven. In both markets, AC claims that its business has been profitable.

In recent years, AC has moved from a position of mainly pursuing very large projects to soliciting smaller ones as well. INPUT estimates that AC wins almost 60% of the projects it actively bids on; and it has completed projects ranging from $2 million to $80 million (average size about $10 million). AC's top commercial customers are concentrated in discrete and process manufacturing, telecommunications, state and local government, banking and insurance, and the federal government.

Although Andersen Consulting did not provide a list of specific projects, Exhibit AC-10 contains information on some of AC's key SI engagements.

EXHIBIT AC-10

Examples of Andersen Consulting's SI Contracts

Company or Industry	Project Description	$ Millions
Lockheed	Computer-aided layout/fabrication	3.0
Ashland Chemical	Order entry/ inventory control	5.5
CA Dept./ Development Services	Cost recovery system	3.6
Social Security Administration	Integrated administrative and financial system	12.0
Electronics Industry	Circuit Board Test and Assembly	52.0
Utility Industry	On-line billing system	30.0
Retail Industry	Finance, inventory, and sales	10.0
Paris Bourse	Stock exchange clearing and settlement	N/A
Swiss Options and Financial Futures Exchange	To plan and implement electronic clearing and settlement system	N/A

13. Summary and Future Directions

Andersen Consulting has an excellent overall image as a systems integrator. Strengths include its ability to manage the client's planning process, the resources to handle very large projects, and its focus on professional services. Its ongoing investments in key applications software products and the continued development and education of its professional staff will continue to build the positive momentum it has in the marketplace.

Not to be overlooked on the positive side is AC's ability to formulate client requirements. Focusing on the high end of the life cycle, AC frequently "writes" the RFP, so to speak—a position that many of its competitors should envy. The result is a very high success rate in winning contracts, which minimizes marketing and bid preparation costs.

In those areas where Andersen Consulting might be perceived as being weak, there are plans in place.

- The inherent problem with the decentralized partnership profit center structure is being addressed by the recent round of reorganizations.
- The "by the book" (perceived by some as overly structured) approach to design and engineering is fading as higher-level and better-trained consultants enter the SI practice.
- A weak technical image is being overcome by heavy investment in proprietary technology.

The future looks bright for Andersen Consulting. INPUT expects its market approach to become more aggressive as the reorganization of the consulting activity falls into place. INPUT anticipates increased focus on Europe and Asia. In addition, the market can anticipate further heavy investments by AC in technology to support both vertical and, to a lesser extent, cross-industry markets.

Appendix: SHL Systemhouse (SHL)

Appendix: SHL Systemhouse (SHL)

1. Key SI Contacts

Peter A. Sandiford
President and Chief Operating Officer
SHL Systemhouse
50 O'Connor Street
Ottawa, Ontario K1P-662
(613) 236-9734

Dennis B. Maloney
President
Systemhouse, Inc. (U.S. Operations)
1010 Glebe Road
Arlington, VA 22201
(703) 276-0500

2. Description of Principal Business

SHL Systemhouse has become an attractive acquisition candidate during 1990. A number of major multinational corporations have demonstrated interest in this talented company.

SHL Systemhouse, Inc. ("Systemhouse") was incorporated in Canada in July 1974. Systemhouse states that its only business is systems integration, which it describes in its 1988 annual report "...as the business of delivering computer and communications systems to meet the specific and unique needs of large organizations. We visualize systems integration as a channel. Technology in the form of computer and communications hardware as well as systems and applications software products, flow through the Systemhouse channel where they are combined through design and a range of implementation services into a full working system for our customers. Ongoing systems management and operation frequently form part of the complete solution organizations are seeking."

Systemhouse does not focus on developing and delivering standalone software products or professional services, but rather fully integrated and operational solutions. The company has added a strong micro-system integration capability through the acquisition of Computerland Canada and Computer Group U.K.

Systemhouse's 1989 fiscal year revenues and profits (Sept. 1, 1988 through August 31, 1989) were $630.8 million and $15.3 million Canadian dollars. This compares with 1988 results of $240.7 million and $5.8 million.

The large revenue increase is primarily a result of the Computerland Canada acquisition. Though profits improved, they have not matched the record 1987 level of $23.7 million. This is primarily a result of 1988 and 1989 losses in Systemhouse's U.S. operations.

Systemhouse's 1988 revenues were 50% from Canada, 48% from the U.S., and 2% from Europe. Revenues in 1989 were 78% from Canada, 21% from the U.S. and 1% from Europe. Again, the Canadian Computerland acquisition caused the significant change in revenue distribution.

Systemhouse revenues for U.S. systems integration during its 1989 fiscal year ending August 31, 1989 were $113 million U.S. Exhibit SHL-1 provides a breakdown of these U.S. revenues.

EXHIBIT SHL-1

SHL Systems
Integration Revenues, 1989

Business Component	$ Millions
Federal	70
Commercial	43
Total	113

Revenues expressed in U.S. dollars

3. Systemhouse's Competitive Position

Systemhouse strengths include:

- An excellent reputation with its customers
- A well-developed set of project management techniques and good implementation experience
- A good reputation and experience in selected vertical industries, particularly federal government, state and local government, and wholesale and retail distribution
- Extensive expertise and experience with a wide range of hardware and software, provided from a broad range of vendors
- Expertise in communications and imaging technology, enhanced through acquisitions and alliances

Systemhouse has also demonstrated the ability to grow through cost-effective acquisitions and to manage these acquisitions efficiently.

Examples of Systemhouse's few weaknesses are:

- It is not a well-known company in the U.S. The systems integration business requires a proven record of success. Though Systemhouse has an excellent track record, it is still not well recognized in the U.S., particularly by commercial customers.
- Its business base is dominated by the industries mentioned earlier which, although constituting a viable market niche, do not directly add to its marketing capability in other commercial opportunities.
- Relatively modest revenues and profits preclude Systemhouse from bidding or being considered for the largest (and most profitable) projects. A significant loss in its Washington D.C. operations in 1988 demonstrated the impact that a single large program has on overall company profitability. The company recognizes this, and its recent acquisition and merger strategy will increase its revenue and profit to spread risk over a larger business base.

4. Markets Served

As mentioned earlier, Systemhouse operates in Canada, the U.S., and Europe. Although it claims not to be vertical market-oriented, it is best known for its work on state and local government and wholesale and retail distribution projects. In the U.S., Systemhouse has also become a successful supplier to the federal government, where it has a growing

number of repeat projects for the Army, Navy, Treasury, and Social Security Administration. Systemhouse also has experienced significant success in the state of California, where three of its six U.S. branch offices are located.

5. Recent Events

Systemhouse has pursued a very aggressive acquisition program to expand its capability and accelerate its growth. Among its major acquisitions are:

- In April 1986, Systemhouse acquired Capital Systems of Alexandria Virginia for $7.5 million. Systemhouse gained 285 employees, $10 million in backlog, and access to the U.S. Departments of Treasury, Health and Human Services, and Transportation, and the Army and Navy.

- In February 1987, Systemhouse acquired the federal systems division of Yipcon Corporation of Fairfield, New Jersey for $4.4 million in cash.

- In September 1987, Systemhouse established a wholly owned European subsidiary, SHL Systemhouse S.A. in Geneva, Switzerland. This subsidiary is responsible for systems integration activities outside of North America. In June of 1989, its European headquarters was moved to London.

- During 1987, Systemhouse acquired two additional Canadian firms, DDC Consultants of Edmonton, Alberta and DPLA of Montreal, Quebec, and a U.S. firm, ICT of Burlington, Massachusetts that has expertise in optical disks and image processing.

- During 1988, Systemhouse purchased GSA of Quebec to expand its capability in that province and Rand Information Systems, a northern California firm, to expand its presence in California and provide data conversion capability to all Systemhouse branches.

- The most significant investment by Systemhouse in 1988 was the acquisition of Computerland Canada in July. Computerland provides Systemhouse with 70 business solution centers in 55 locations throughout Canada. These centers are described by Systemhouse as much more than retail stores, and expand its microcomputer-based systems integration capacity significantly.

- As of August 31, 1989, the company acquired Computer Group plc, the largest franchisee of Computerland Corp. in the United Kingdom.

During the second quarter of 1988, Systemhouse entered into a five-year teaming agreement with Chicago-based Ameritech to work cooperatively on the development of systems integration opportunities in the five-state region where Ameritech provides telephone service. It is anticipated that this agreement will result in over $100 million of revenue. This agreement also includes the licensing of Systemhouse's proprietary Systems Integration Life Cycle Methodology (SILC) to Ameritech for $12 million.

In the first quarter of 1990, Kinburn Technology, a unit of Kinburn Corp. and SHL Systemhouse's parent, announced that it could not repay outstanding debts of about $700 million. To satisfy its debtors, Kinburn Technology has offered to sell or transfer ownership of its 50.1 percent interest in SHL Systemhouse.

Systemhouse would appear to be an excellent acquisition for companies that want to participate in the rapidly growing SI market.

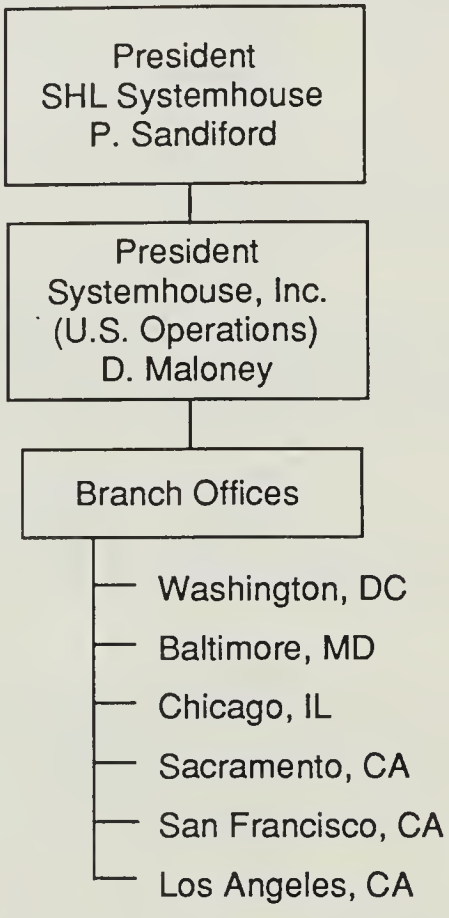
6. SI Organization

Systemhouse has a simple U.S. organization that is project management-focused. The organization consists of six branch offices and National Systems, that report to the President of Systemhouse, Inc, Dennis Maloney. Mr. Maloney, located in Washington D.C., reports to the president of Systemhouse, Peter Sandiford. Each of the branch offices has geographic responsibility for SI projects and operates as a profit center. The U.S. organization is depicted in Exhibit SHL-2.

Branch offices are located where the majority of Systemhouse's clients are located—in California, the Washington-Baltimore corridor, and the Chicago region. Systemhouse will establish new branch offices and profit centers as the quantity of work grows in other geographic areas.

EXHIBIT SHL-2

Systemhouse U.S. Organization



Based on INPUT's interviews with Systemhouse, responsibilities are distributed as shown in Exhibit SHL-3.

EXHIBIT SHL-3

Centralization/Decentralization of Business Functions Systemhouse

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	B
Marketing and promotion	B	B
Account management/ sales	D	D
Contract review/approval	B	B
Project management/ control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations	N/A	N/A

C = Centralized, D = Decentralized, B = Both

This exhibit demonstrates Systemhouse's decentralized organizational focus, with branches involved in all business functions and with centralized support in the areas of strategy and long-range planning, marketing and promotion, contract review and approval, and hardware and software acquisition.

Systemhouse has approximately 3,100 employees doing systems integration work worldwide. Approximately 750 of these employees are involved in U.S. operations. Exhibit SHL-4 shows how these resources are distributed.

EXHIBIT SHL-4

Distribution of SI Personnel Systemhouse

Capability	Percent
Management, strategy, planning, marketing	5
Legal/contract administration, finance	5
Project management and administration	10
Design/development/implementation	40
Hardware/software evaluation/acquisition	20
Hardware engineering	10
Sales	10

7. SI Business Objectives

Systemhouse wants to continue to grow at over 30% and achieve net profits that exceed 10%. It is attempting to achieve these goals by focusing on systems integration as its only business. By investing in relationships with technology suppliers and in technology evaluation and training, the company has positioned itself to meet its key business objectives. These objectives are to provide its customers with the best possible technical solutions and to increase its revenues and profits.

Account control and follow-on hardware sales and facilities management contracts are secondary business objectives.

8. Internal SI Capabilities Evaluation

Fundamental to Systemhouse's business strategy is its proprietary Systems Integration Life Cycle methodology (SILC), which the company continues to refine and enhance. Systemhouse is currently on Version 6 of this methodology which it believes leads the industry by at least two to three years.

Each employee receives and must sign for a set of ten or so volumes that describe each of the elements of the SILC methodology. The books address how to approach each of the elements of defining and imple-

menting a system solution. SILC goes well beyond traditional system development methodologies, encompassing not only the software development cycle, but also project management, strategic planning, facilities engineering, quality assurance, architecture definition, capacity planning, and other disciplines essential to successful systems delivery.

The methodology is well-conceived, practical, and uses the most advanced tools, including CASE and modeling techniques.

Although there is a certain amount of mystique regarding SILC, INPUT believes that it is the result of a significant investment in methodology that will provide Systemhouse with a competitive advantage. It provides a set of tools that lead the industry, results in efficient implementation, on time and within budget, and significantly reduces the risk of major failure.

a. Business Consulting

Though the SILC methodology includes business consulting, INPUT believes its focus is on capturing current requirements and processes so that technology can be applied to automate them. It is not business consulting from the perspective that results in fundamental business process change. Systemhouse does not have strong vertical industry knowledge and depends on the customer for industry business process knowledge. Though this is not a serious obstacle, it may preclude Systemhouse from bidding on some SI opportunities where the customer requirements include business consulting and business process change.

b. Design Methodology, Design and Integration, Project Management, Software Development, and Education, Training and Documentation

These SI elements are all included in the SILC methodology described above and Systemhouse receives very high marks for these capabilities. Systemhouse has told INPUT that it prides itself in its ability to develop and maintain highly qualified project managers. The company indicates that its personnel policies are designed to retain project managers, many of whom have over 15 years of experience.

c. Packaged Application Software

Systemhouse chooses not to develop packaged application software, but rather prefers the option to select the best available packages in the market to meet the needs of the current SI engagement. Its parent, Kinburn Technologies, was unsuccessful in the software business and has discouraged Systemhouse from investing in the development of application software packages.

d. Packaged Systems Software

As with applications software, Systemhouse prefers to select the best available hardware and software for the current SI engagement and not to be biased by a limited set of software and hardware vendor relationships. It has relationships with most leading fourth-generation software vendors.

e. Standard Computer Hardware

Systemhouse has no hardware products of its own. It has relationships and experience with most leading hardware vendors' equipment, including, but not limited to, DEC, IBM, HP, Wang, and Tandem. Its recent acquisition of Computerland Canada, and Computer Group PLC., will expand these relationships significantly in the microcomputer area.

f. Custom Computer Hardware

Systemhouse does not develop custom computer hardware.

g. Network Management and Operations

Though Systemhouse has strong ties with Ameritech, it does not participate independently in the network management and operations market.

h. Service and Repair

Systemhouse depends on hardware manufacturers for hardware service and repair.

i. Software Maintenance

Since Systemhouse does not develop system or application software packages, its software maintenance capability is limited to custom software repair and enhancement.

9. SI Strategic Alliances

Systemhouse has strong relationships with a variety of hardware and software vendors that are described in Section 8. These include, but are not limited to, hardware vendors Digital Equipment, IBM, Hewlett-Packard, Amdahl, and Wang, and software vendors Oracle and Relational Technologies in data base management systems and Cognos and Applied Data Research in fourth-generation languages. Northern Telecom, another Canadian vendor, is a sound and logical choice for a communications partner. Exhibit SHL-5 summarizes these alliances.

EXHIBIT SHL-5

SHL Systemhouse Strategic Alliances

Hardware	Digital Equipment IBM Hewlett-Packard AMDAHL Wang
Systems Software	ORACLE Relational Technology COGNOS Applied Data Research
Telecommunications	Northern Telecom Ameritech

As mentioned earlier in this report, Systemhouse has also established a five-year alliance with Ameritech to provide systems integration services to the five-state region where Ameritech provides communications services. This alliance has proved successful and several contracts have been won and are being implemented.

10. SI Capabilities Summary

Overall, Systemhouse has a strong set of system development and implementation skills, built around its proprietary SILC methodology. It intentionally lacks packaged application and systems software, standard and custom computer hardware, and communications hardware capabilities. It has established a broad set of alliances with hardware and software vendors to provide those elements it lacks. It uses these relationships to select the best set of components to satisfy the needs of each systems integration opportunity.

11. SI Marketing Strategy

Systemhouse's marketing is built around excellence in a single business—systems integration. To support this strategy it has developed a broad set of technical skills and its proprietary Systems Integration Life Cycle methodology. The company offers its services to any market that demonstrates a genuine need for systems integration services. It will

respond to RFPs and leverage its previous success in existing accounts. It will add new branch offices to service new geographic areas when sufficient business is generated.

- Competitors—Systemhouse considers Andersen Consulting and EDS to be its major competitors in the U.S. commercial market. It also recognizes other "Big Eight" accounting firms and hardware manufacturers as additional commercial SI competition. It has identified EDS, CSC, Andersen Consulting, and IBM as its major competitors in the federal arena.

- Positioning—Systemhouse indicates that its strategic focus is on federal government, state and local governments, wholesale and retail distribution markets, and telecommunications and imaging opportunities. The firm does not focus on specific vertical markets, but rather on opportunities where it can leverage its methodology and technology expertise to satisfy an integration requirement.

  Its strategy also includes leveraging applications installation experience. An example of this successful approach is the company's ten successive awards for welfare eligibility systems in state governments.

- Promotion—Systemhouse does limited, if any, formal promotion in the U.S. market. It relies solely on referrals of satisfied customers and claims that this "word-of-mouth" promotion has been highly successful. However, the company has recently indicated that it will add a vice president of marketing.

12. SI Customer Base

Systemhouse has successfully completed a significant number of commercial and federal SI projects. Examples of some of these programs are depicted in Exhibit SHL-6.

Systemhouse performed on additional programs that include welfare eligibility systems for Arizona, Idaho, Utah, Alaska, Kansas, Wyoming, South Carolina, Montana, Kansas, and Washington. Commercial systems integration projects include a retail product tracking system for Actmedia, Inc., an ISDN networking system for McDonald's corporate headquarters, a billing verification system for U.S. Sprint, and a central customer interface system for GTE. Federal programs included a DEC VAX-based planning, programming and budgeting system for the U.S. Navy, an on-line image-based tool cataloging system prototype for the Defense Logistics Agency, and an on-line Social Security Entitlement Program for the Social Security Administration. Among its projects with its new partner, Ameritech, is a public safety communications system for Marion County, Indiana.

EXHIBIT SHL-6

Examples of Systemhouse's SI Programs

Company/Industry	Project Description	$ Millions
State of California	Student financial aid	5.2
Hawaii Dept. of Social Welfare Eligibility	Welfare eligibility	4.1
Columbus/Franklin County Library	Support system	2.8
Chrysler Corporation	Quality assurance system	N/A
State of Pennsylvania	Liquor point-of-sale system	N/A
CONTEL	Service control and dispatch	N/A

13. Summary and Future Direction

Systemhouse's strength is built around its methodology, SILC, and its ability to manage the application of technology to identified business problems. It has the ability to understand and manage many technologies from many vendors.

Systemhouse promotes itself as a vendor that is not wed to a particular vendor's hardware or software. This allows it to develop and propose a solution that is objective and not biased by the limited product offerings of any single or limited set of vendors.

Systemhouse has an excellent reputation among its customer base. This reputation has proven effective as a reference to acquire new clients and to establish alliances with a large number of important hardware and software vendors.

The alliance with Ameritech provides Systemhouse with a source of new clients and additional revenue and profit growth. It also provides it with a partner to strengthen a weakness in the networking area.

Systemhouse needs to continue to expand its presence in the U.S. market. Its current six branch office network somewhat limits its ability to do this.

Systemhouse's affinity for developing vertical-industry knowledge and applications software packages may preclude it from succeeding in an important segment of the systems integration market. This is the segment in which the customer is looking for business consulting as a means to change some of the fundamental business processes within the enterprise. INPUT believes that this set of customers will ultimately look to the same business consultants, if they are integrators, to implement the recommended change through an SI contract.

Finally, INPUT believes that Systemhouse, based on its commitment to excellence and continued investment in SI methodology, will continue to enjoy success and be an important player in the U.S. systems integration market.

Appendix: Oracle Systems Corporation

ORACLE SYSTEMS CORPORATION
20 Davis Drive
Belmont, CA 94002
(415) 598-8000

Lawrence J. Ellison, President and CEO
Public Corporation, OTC
Total Employees: 4,148
Total Revenue, Fiscal Year End 5/31/89: $583,673,000

The Company

Oracle Systems Corporation develops, markets, and supports software products used for data base management, applications development, decision support, and computer network communications. The company's principal product, the ORACLE[R] relational DBMS, is a SQL-based, relational data base management system that runs on a broad range of computers. During 1988 and 1989, Oracle expanded its offerings to include financial, manufacturing, and office automation applications software products and systems integration services.

- Oracle was founded in June 1977 as Relational Software, Inc. In January 1983, the company name was changed to Oracle Corporation to better identify with its well-known ORACLE relational data base management software product. In June 1985, Oracle Systems Corporation was formed as the parent company of Oracle.

- In March 1986, Oracle made an initial public offering of 2.1 million shares of common stock, of which one million shares were offered by the company and the remaining 1.1 million shares by shareholders. Net proceeds were approximately $14 million.

During 1989, Oracle established several new strategic business units as part of its strategy to meet customers' ever-changing requirements and to expand its product/service base.

- In October 1989, Oracle established its U.S. Manufacturing Group and announced a three-pronged strategy for entering the computer-integrated manufacturing (CIM) marketplace.

  - Strategy components include the following: ORACLE, which will serve as a foundation for all applications development and integration; the Oracle Manufacturing and Oracle Financials product families; and working with CIM

Partners who have developed Oracle-based engineering or shop floor applications.

- Oracle Data Publishing, formed in November 1989, is a subsidiary whose charter is to provide customers access to a variety of computer-based information services. It will acquire and sell, in electronic format, a range of data and information which many Oracle customers already use in print form.

- The Graphics Products Division, formed in September 1989, is chartered to produce and market a range of graphics-oriented products for end users and applications developers, and to provide graphics technologies to other Oracle units for future products.

- The Network Products Division, formed in September 1989, was established to enhance Oracle's SQL*Net connectivity tool; to extend Oracle's leadership in distributed data base technology; to develop new software tools that simplify customer development of applications for networks; and to develop products and services that will enable customers to operate, administer, and maintain their distributed, heterogeneous information systems.

- Oracle Secure Systems was formed in April 1989 to lead the development and marketing of high security relational data base management systems applications to commercial and government organizations worldwide. Oracle has been working with the National Computer Security Center since July 1988 to develop data base security capabilities which will be incorporated into ORACLE.

- In June 1988, Oracle entered the systems integration business through the formation of its subsidiary, Oracle Complex Systems Corporation (OCSC). The business was expanded later in 1988 with the acquisition of Falcon Systems, Inc.

  - Falcon Systems (Bethesda, MD) was purchased by OCSC in November 1988 for $13.7 million in cash and $4.6 million in notes.

  - Falcon Systems, a provider of systems integration services to federal government clients, had approximately 200 employees at the time of the acquisition and estimated 1988 revenue of $40 million.

Oracle's fiscal 1989 revenue reached $583.7 million, a 107% increase over fiscal 1988 revenue of $282.1 million. Net income

increased 91%, from $42.9 million in fiscal 1988 to $81.8 million in fiscal 1989. A five-year financial summary follows:

ORACLE SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	5/89	5/88	5/87	5/86	5/85
Revenue	$583,673	$282,113	$131,271	$55,383	$23,159
• Percent increase from previous year	107%	115%	137%	139%	82%
Income before taxes	$120,245	$64,979	$27,898	$10,475	$2,585
• Percent increase from previous year	85%	133%	166%	305%	13%
Net income	$81,766	$42,886	$15,623	$5,896	$1,551
• Percent increase from previous year	91%	175%	165%	280%	12%
Earnings per share (a)	$0.61	$0.32	$0.12	$0.05	$0.02
• Percent increase from previous year	91%	167%	140%	150%	--

(a) Restated to reflect a 2-for-1 stock split effected in June 1989.

Oracle management attributes revenue increases in fiscal 1989 and 1988 primarily to increases in the number of customers and installations of the company's products. The company's product and customer base has broadened significantly during the past three fiscal years as the company increased the number of computers and operating systems on which ORACLE operates and introduced new products and services supporting ORACLE.

- Licenses for use on DEC minicomputers, although increasing in number, have declined from approximately 50% of new license revenue in fiscal 1987, to 43% in fiscal 1988 and 35% in fiscal 1989. Over the same period, revenue from new licenses for use on IBM and compatible mainframes and microcomputers have increased from a small percentage of revenue for fiscal 1987 to 24% for fiscal 1988, then decreased to 12% in fiscal 1989.

- Services revenue increased 116% during fiscal 1989 primarily due to growth in the company's range of consulting and systems integration services.

Research and development expenditures (prior to the effect of capitalized amounts) were approximately $63.1 million (11% of

revenue) in fiscal 1989, $30.2 million (11% of revenue) in fiscal 1988, and $15.1 million (12% of revenue) in fiscal 1987.

Revenue for the six months ending November 30, 1989 reached $400 million, an 87% increase over $214.4 million for the same period in 1988. Net income for the period increased from $24.3 million to $40.2 million.

As of May 31, 1989, Oracle had 4,148 full-time employees (of which 2,151 were located in the U.S. and 1,997 were employed in 24 other countries), segmented as follows:

Marketing	336
Sales and services	2,797
Research and development	519
General and administrative	496
	4,148

- Oracle currently has approximately 6,200 employees.

Competitors of Oracle's data base management software include the following:

- IBM mainframe market: IBM (DB2 and SQL/DS), Computer Associates (IDMS/R, DATACOM), Cincom (Supra), Information Builders (FOCUS), and Software AG (ADABAS)
- Minicomputer market: INGRES Corporation (INGRES), Cognos (Powerhouse), Data General (DG/SQL), DEC (RDB), Sybase (SYBASE), and Wang (Pace)
- IBM-compatible microcomputer market: Ashton-Tate (dBASE) and Information Builders (PC FOCUS)
- UNIX-based microcomputer market: Unify Corporation (UNIFY), Informix (INFORMIX), and INGRES Corporation (INGRES)

In the application software market, competitors include Mccormack & Dodge (Dun & Bradstreet Software Services), ASK Computer Systems, Ross Systems, and Walker Interactive Systems.

Key Products and Services

A three-year summary of source of revenue, as provided by Oracle, follows:

ORACLE SYSTEMS CORPORATION
THREE-YEAR SOURCE-OF-REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	5/89		5/88		5/87	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Software licenses	$417.8	72%	$205.4	73%	$101.3	77%
Services (a)	165.8	28%	76.7	27%	30. 0	23%
TOTAL	**$583.6**	**100%**	**$282.1**	**100%**	**$131.3**	**100%**

(a) Includes maintenance, training, and consulting.

Oracle's principal product is the ORACLE relational data base management system. ORACLE allows users to define, retrieve, manipulate, and control data stored in a computer using the SQL nonprocedural language.

- ORACLE was designed and written to make it adaptable or portable to most computer hardware and operating systems. This portability allows customers to use the same data base management software and user interface on all their machines. ORACLE has been ported to a variety of microcomputers, minicomputers, and mainframes.

- The company released the latest version of ORACLE, ORACLE Version 6.0 with Transaction Processing Subsystem (TPS), during fiscal 1989.

- SQL*Net^{R} is a connectibility tool that makes it possible for an ORACLE application running on one machine to access its local data base and simultaneously access remote data bases on other machines running ORACLE (as well as other non-ORACLE data bases), anywhere within a communications network.

- SQL*Star^{R}, the company's distributed data base architecture, allows customers to write applications that operate on data distributed across multiple ORACLE data bases. SQL*Star also allows users to query for information contained on multiple computers with separate ORACLE data bases without specifying the location of any of that information. SQL*Star

contains a product component called SQL*Connect, which is designed to be a gateway to non-ORACLE data bases and initially supports IBM's DB2, SQL/DS, and RMS.

- The price for a microcomputer version of ORACLE ranges from $199 to over $46,000. A minicomputer or mainframe version ranges in price from $4,600 to approximately $294,000. Some site discounts for multiple licenses are available. Maintenance services are available at a cost of 15% to 22% of the current license list price per year. Maintenance services include technical support, system updates, and user documentation.

The company currently offers the following applications development productivity tools as separate products to be used as add-ons to ORACLE:

- SQL*Forms® allows applications developers to design, prototype, and customize forms-based applications without programming.

- SQL*ReportWriter™ allows applications developers to create highly formatted reports without programming.

- SQL*Menu® allows applications designers to build a dynamic menu interface to both ORACLE and non-ORACLE products and applications.

- SQL*Plus® allows users to execute SQL queries interactively and from a command file, as well as perform data administration and data transfer functions.

- SQL*Graph® allows users to generate high resolution pie, line, or bar graphs from data stored in an ORACLE data base.

- SQL*Report® lets applications developers build complex reports programmatically.

- CASE*Method℠ is a methodology that provides a structure for systems designers to develop and implement systems.

- CASE*Dictionary™ supports the CASE*Method, providing utilities to help systems designers develop, implement, and document application systems.

- CASE*Designer™ provides a bit-mapped graphical interface to CASE*Dictionary.

- CASE*Generator™ allows applications developers to generate working SQL*Forms applications using information in CASE*Dictionary.

- SQL*Forms, SQL*Plus, and SQL*Report are available on all of the computers and operating systems on which ORACLE Version 6.0 is available. SQL*ReportWriter, SQL*Menu, the CASE* products, and SQL*Graph are or are intended to become available on most of the significant computers and operating systems on which ORACLE is available.

Oracle currently offers the following decision support products for use with ORACLE:

- SQL*QMX™ is an ad hoc query and fill-in-the-blank reporting tool for end users.

- SQL*Calc® provides a spreadsheet interface to ORACLE and allows users to access and modify the data base from within a SQL*Calc spreadsheet.

- Easy*SQL® gives casual and novice users a simple interface to build and use ORACLE data bases without having to learn SQL command syntax.

- The ORACLE data base add-in for Lotus 1-2-3 allows Lotus 1-2-3 users to access and manipulate ORACLE data from within their 1-2-3 spreadsheet. This product is available on MS-DOS.

- Except for ORACLE for 1-2-3, the above decision support products are currently available on DEC VAX minicomputers using the VMS operating system and on the IBM PC/XT, PC/AT, PS/2, and compatible microcomputers. The company intends to port all four products to other computer models and plans to introduce additional decision support products in the future.

Oracle also offers the Pro* series of six tools that allows a programmer to access an ORACLE data base using SQL from programs written in traditional programming languages.

- These tools - called Pro*COBOL®, Pro*C™, Pro*FORTRAN®, Pro*Ada®, Pro*PL/1®, and Pro*Pascal® - provide programmatic interfaces to the indicated languages.

- The Pro* series of tools is available on most of the computers and operating systems on which ORACLE is available.

Oracle's office automation applications software products available for use with ORACLE include SQL*Calc, the ORACLE data base add-in for Lotus 1-2-3, and Oracle*Mail™, a portable, distributed electronic mail system introduced in October 1989.

Oracle offers several families of application software products which support ORACLE and Oracle's development and decision support tools. The products are being ported to the same hardware platforms on which ORACLE is available.

- Oracle Financials™, introduced in 1988, is a family of accounting application software products designed for centralized and decentralized accounting departments in companies of any size.
  - Oracle Financials products currently include Oracle General Ledger™, Oracle Payables™, Oracle Assets™, Oracle Payables™, Oracle Receivables™, Oracle Revenue Accounting™, and Oracle Personnel.
- Oracle Government Financials, introduced in September 1989, a family of integrated accounting software packages for federal, state, and local governments.
  - The product family includes Oracle Government General Ledger, Oracle Government Purchasing, Oracle Government Payables, Oracle Government Revenue Accounting, and Oracle Government Receivables.
- Oracle Core Manufacturing, introduced in October 1989, is a full-function manufacturing product family tightly integrated with Oracle Financials.
  - Products include Oracle Inventory, Oracle Bill of Materials, Oracle Work in Process, Oracle Master Scheduling, Oracle MRP, and Oracle Order Entry.
  - The products are currently available for DEC VAX/VMS, Data General, Hewlett-Packard, Sequent, and Pyramid computers, and will be ported to Sun and other mainframe, minicomputer, workstation, and microcomputer systems on which ORACLE is available.

Oracle also provides the following services:

- Oracle Complex Systems Corporation (OCSC) is an Oracle subsidiary formed during fiscal 1989 that provides systems integration services to both commercial and government clients.

As a systems integrator, OCSC assumes full responsibility for the integration of hardware, software, networks, facilities, and services.

- OCSC specializes in providing Oracle-based information management solutions, combines with value-added knowledge and experience in distributed data bases and heterogeneous environments; building/delivering fully integrated image and compound data management systems; and providing high performance systems using parallel processing and other emerging technologies.

- Current activities cover a range of complex projects including: systems engineering, project management, prime contracting, and systems integration.

- OCSC is a leading provider of systems integration services in the area of image processing technology. OCSC has participated in one of the world's largest imaging projects and includes customers in the federal, state, and commercial markets.

- Consulting services include strategic systems planning, systems management, systems architecture development, customized applications development, and in-house technology integration support. Consulting projects range from ad hoc consultations billed by the hour to fixed-price custom development projects in excess of $1 million.

- Oracle operates education centers at most of its major offices and also offers on-site training in support of customers' use of the company's software products. Training and education course range from hourly fixed-price classes to custom seminars.

Industry Markets

Oracle's products are targeted at Fortune 2000 companies and other similarly-sized organizations in the finance, telecommunications, and government sectors.

- Total revenue from commercial end user software licenses was approximately 41%, 49%, and 45% of revenue for fiscal 1989, 1988, and 1987, respectively.

- Revenue from U.S. and non-U.S. government users represented approximately 6%, 6%, and 8% of revenue in fiscal 1989, 1988, and 1987, respectively.

- Revenues from OEMs and VARs represented 9%, 10%, and 8% of total revenue for fiscal 1989, 1988, and 1987, respectively.

Oracle also distributes its products through OEMs and VARs that combine ORACLE with their hardware or software products and redistribute the combined product.

- Computer manufacturers who have the right to relicense ORACLE under agreements with the company include Altos Computer Systems, American Telephone & Telegraph Company, Arix Systems Corporation, Bull HN Information Systems, Control Data Corporation, Convex Computer, Danish Data Electronics, Data General, Datapoint Corporation, Edge Computer, ELXSI Systems, Encore Computer Corporation, FileNet Corp., Harris Corporation, IBM (for the System/88 and RT PC machines), Intergraph, MIPS Computer Systems, Motorola, NEC, NCR Corporation, NTT, Olivetti, Prime Computer, Pyramid Technology Corporation, Sequent Computer Systems, Stratus Computer, Texas Instruments, Toshiba Corporation, and Unisys Corporation.

Geographic Markets

Oracle derived approximately 52% of fiscal 1989 revenue from the U.S., 34% from Europe (33% from Oracle subsidiaries and 1% from distributors), and the remaining 14% from other international sources (virtually all from Oracle subsidiaries). A three-year summary of source of revenue follows:

ORACLE SYSTEMS CORPORATION
THREE-YEAR SOURCE-OF-REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	5/89		5/88		5/87	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
U.S.						
Oracle domestic operations	$301.7	52%	$148.1	53%	$69.8	53%
International						
Oracle operations						
• Europe	192.9	33%	98.7	35%	47.9	36%
• Other international	80.3	14%	28.1	10%	9.5	8%
Foreign distributors						
• Europe	5.3	1%	3.4	1%	1.2	1%
• Other	3.5	--	3.7	1%	2.9	2%
TOTAL	**$583.7**	**100%**	**$282.1**	**100%**	**$131.3**	**100%**

Oracle markets its products through a direct sales force in the U.S. and through wholly owned subsidiaries and independent distributors in foreign countries.

- Oracle maintains offices in the following U.S. cities or metropolitan areas: Los Angeles, Newport Beach, Sacramento, San Diego, and San Francisco (CA); Denver (CO); Phoenix (AZ); Atlanta (GA), Chicago (IL); Bethesda (MD); Boston and Lexington (MA); Detroit and Grand Rapids (MI); Minneapolis (MN); Kansas City and St. Louis (MO); Iselin (NJ); New York Rochester (NY); Charlotte (NC). Cincinnati, Cleveland, and Columbus (OH); Philadelphia and Pittsburgh (PA); Dallas and Houston (TX); Salt Lake City (UT); Burlington (VT); and Seattle (WA).

- International wholly owned subsidiaries market and support Oracle products in Austria, Australia, Belgium/Luxembourg, Brazil, Canada, Denmark, Finland, France, Greece, Hong Kong/Macau, Ireland, Japan, Malaysia, Mexico, the Middle East, the Netherlands, New Zealand, Norway, the People's Republic of China, Portugal, Singapore, Spain, Sweden, Switzerland, Turkey, the U.K., West Africa, and West Germany.

- International distributors are located in Anguilla, Antiqua, Argentina, Barbados, Barbuda, Brazil, Canada, Chile, Columbia, Dominica, Equador, Granada, Guyana, Guatemala, India, Indonesia, Italy, Ivory Coast, Jamaica, Japan, Monserrat, Nevis, Nigeria, Norway, Pakistan, the Philippines, Portugal, South Korea, St. Kitts, St. Lucia, St. Vincent, Surinam, Taiwan, Thailand, Trinidad, Uruguay, Venezuela, Yugoslavia, and Zimbabwe.

Computer Hardware and Software

Oracle has various computers installed at its headquarters in Belmont.

Appendix: Platform Integration Examples

PLATFORM INTEGRATION EXAMPLE # 1

SYSTEMS INTEGRATION PROJECT REPORT

Discrete Manufacturing
Code: VI-002
Date: 3/88
Project: Data Center Consolidation

Customer: USS/POSSCO Industries

Business Problem

Partnership established to consolidate Sales and I.S. activities at a centralized location. There was a need to update operational unsupported programs and redesign outdated programs.

Major Tasks

- Developed an Information Systems design for a centralized data center.
- Redesign the unique and unsupported programs currently in operation.
- Redesign a production control system.
- Provide facilities management services.

Contract Information

TYPE	AMOUNT	DURATION
Fixed-Price	25.0 ($M)	60 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
86-87	6/87	7/87	9/87	10/93

Contractor

	COMPANY	FUNCTION
Prime Contractor	Computer Task Group	
Subcontractor		
Outside Consultant		

Project Components

Equipment

The hardware came from the two existing facilities and needed to be integrated into the one comprehensive integrated unit.

Software Products

- Systems Software

  Existing system software will be used.

Professional Services: $9.0 M

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services—	P	Project Management—	P
Design/Integration—	P	Education/Training—	P

Software Development

Using TRANSFORM, INC: TRANSFORM and CORTEX—redesign and convert current code and unsupported software; make modifications to existing system software to update.

Other Products and Information Services: $16.0 M

Provide facilities management services.

Project Status

Building established, computer system operational, migration of applications half done, and the writing of new systems in progress.

PLATFORM INTEGRATION EXAMPLE #2

SYSTEMS INTEGRATION
PROJECT REPORT

MEDICAL

Code: VIII-001A
Date: Original 3/88; Revision 11/88
Project: Medcom

Customer: Humana Inc.

Business Problem

Major changes in the health-care industry necessitated an end-to-end information system. The system had to accommodate a DRG-based billing system for Medicare claims.

Major Tasks

- Provide data-over-voice communication system in a port-contention arrangement.
- Provide terminals in patient rooms for input/retrieval of information.
- Implement an integrated system that will be able to add new functional departments in the future.

Contract Information

TYPE	AMOUNT	DURATION
Fixed-Price	3.0 ($M)	36 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
MID-1986	N/A	N/A	7/85	9/89*

*See Project Status

Contractor

	COMPANY	FUNCTION
Prime Contractor	Health Data Sciences	
Subcontractor		
Outside Consultant		

Project Components

Equipment: $2.0M

Data General MV 10000 (4), Human Design Custom terminals with magnetic card reader (500), and Data General LAN Radial MCS

Software Products: $0.2M

- Systems Software

  Data General standard ADS/VS, PL1, SNA-SDLC, SNA, and SNA/RJE packages

- Applications Software

  HDS: Ulti-MUMPS and Ulti-Care packages

Professional Services: $0.8M

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services -	P	Project Management -	P
Design/Integration -	P	Education/Training -	P

Software Development

Ulti-MUMPS and Ulti-Care modified by HDS.

Project Status

The project is in the alpha test implementation phase. Significant data recovery, data base redundancy, and a system to handle hardware failures have been on-line since August 1988. These systems have enabled better than 99% availability to the users. The primary core functions (admission/discharge/transfer, patient billing, hospital census, and laboratory system) are currently on-line. The radiology and pharmacy systems are expected to be implemented in another six to eight months.

Another RFP was released at the beginning of November 1988 to re-do the entire project. Humana feels that other vendors have reached a stage where the complexity and cost of the system will not be a handicap. The bids are due back by the end of 1988, with an award expected to be made by March 1989.

Humana is looking for a turnkey solution, with an emphasis on host connectivity. A package allowing the installation of the core applications, the ancillary functions, and the nursing functions would be ideal.

Humana will continue the original project as a learning experience, and will run it parallel to the new systems. If the winning vendor provides an incompatible system, Humana may consider keeping one Data General machine.

Appendix: Network Integration Examples

NETWORK INTEGRATION EXAMPLE #1

SYSTEMS INTEGRATION
PROJECT REPORT

STATE AND LOCAL GOVERNMENT

Code: X-020
Date: 11/88
Project: State Telecommunications Network

Customer: State Government

Business Problem

Faced with sizeable long-distance rate increases, the state needed a more cost-effective system to handle its voice and data communications needs. There was also a need to link the standalone state agency networks into a statewide system.

Major Tasks

- Design, build, and staff a network management center.
- Convert the primarily analog system to a digital network.
- Incorporate the four major dedicated networks into the state system, enabling access to shared data bases.

Contract Information

TYPE	AMOUNT	DURATION
Fixed-Price & Tariff Passthrough	226.9 ($M)	120 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
10/84	6/85	9/85	12/85	6/97

Contractor

	COMPANY	FUNCTION
Prime Contractor	AT&T	
Subcontractor		
Outside Consultant		

Project Components

Equipment $25.1M

AT&T 3B 600s, 2s, 5s, Accunet T1.544 Recurring (T-1), modems, DSUs, digital switches/concentrators, 740 multiplexers - InterLATA, 745 Multiplexers - InterLATA, 740 Multiplexers - IntraLATA, fiber optic backbone, leased bit compression multiplexers for STS

Software Products: $4.4M

- Systems Software

  Datakit 2000 (AT&T proprietary protocol to packetize the data backbone), centralized tracking systems, centralized service manager, Starkeeper

Professional Services: $5.2M

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services -	P	Project Management -	P
Design/Integration -	P	Education/Training -	P

Software Development

The Informix relational data base is being used to develop a consolidated billing system, management reporting, and statistical performance monitoring reports.

Other Information Services: $188.1M

Common carrier backbone; inter- and intraLATA tail circuits; wiring; tariffs and common carrier service for inter- and intraLATA, ANI, interstate, and direct distance dialing; T-1 service charge; DCSS teleconferencing.

Other Non-Information Services: $4.1M

Design and build the network management center.

Project Status

Project is in the implementation stage. The project had originally included both the voice and the data communications systems. Advances in technology led to a re-bidding of the data communications system to improve the design. AT&T won that contract as well. The state is currently in a one-year cutover period to data design. Future plans involve including the lottery on the state-owned network.

NETWORK INTEGRATION EXAMPLE #2

SYSTEMS INTEGRATION
PROJECT REPORT

STATE AND LOCAL GOVERNMENT

Code: X-009
Date: 6/88
Project: Data Communications Network

Customer: State Agency

Business Problem

Individual state-wide agency networks were using costly data transmission services. In order to reduce costs and redundant data, a single state-wide network connected to a centralized data base was needed.

Major Tasks

- Create a Network Control Center to serve as focal point for state-wide network.
- Organize an Integrated Control System (ICS) designed to provide an agency-wide data base for storing administrative records (e.g., accounting, purchasing, personnel, payroll).
- Redesign network and communications circuits to increase transmission speeds, while supporting some 3,200 terminals, printers, and other addressable devices operating under IBM SDLC and BSC and Sperry Uniscope protocols.
- Procure protocol converters to help improve response time and increase user productivity.

Contract Information

TYPE	AMOUNT	DURATION
Fixed Price	21.6 ($M)	30 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
N/A	8/80	12/80	6/81	12/86

Contractor

	COMPANY	FUNCTION
Prime Contractor	BCS	
Subcontractor	Paradyne Sync Research Siemans	Modems and modem management system Design and build protocol applications converter X.25 switch
Outside Consultant		

Project Components

Equipment: $9.0M

IBM 4361 (1), Paradyne modems (1300), T-PADS (200), X.25 switch, testing equipment.

Software Products

- Systems Software

  Standard IBM VM/CMS operating system.

Professional Services: $5.0M

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services -	P	Project Management -	P
Design/Integration -	P	Education/Training -	P

Software Development: $4.0M

Boeing Computer Services Co. (BCS) developed proprietary Network Management Control System (NMCS) to integrate the central management systems of the various vendors. Paradyne modified their Analysis 5500 processor to integrate with the modem management system. A protocol conversion system and an X.25 front-end processor for the IBM 4361 were developed.

Operations and Maintenance: $2.0M

Provide on-site maintenance.

Non-Information Services: $1.6M

Construct building to house the data center.

Project Status

Project is completed and working well. Boeing is currently training the in-house staff to run the network. Upgrading to an IBM 4380 within the next few months.

Appendix: Applications Integration Examples

APPLICATIONS INTEGRATION EXAMPLE #1

SYSTEMS INTEGRATION
PROJECT REPORT

BANKING AND FINANCE

Code: II-001
Date: 5/88
Project: Banking Applications

Customer: Financial Institution

Business Problem

Bank was using a processing services vendor. After developing too many unworkable bugs, operational problems, and less-than-satisfactory quality of work, the bank felt it needed a more accurate and flexible programming support system. An on-site data center was more consistent with current business plans.

Major Tasks

- Replace on-line teller machines.
- Create an on-site data center.
- Provide telecommunications capabilities to all branches and the main ATM switch.
- Install all new application programs.

Contract Information

TYPE	AMOUNT	DURATION
Fixed Price	3.5 ($M)	60 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
N/A	9/86	1/87	2/87	2/92

Contractor

	COMPANY	FUNCTION
Prime Contractor	Systematics	
Subcontractor	IBM Arkansas Systems Diebold	H/W Maintenance Teller Machine Interface ATM Interface
Outside Consultant		

Project Components

Equipment: $0.8M

IBM 4341 (1), 3350 disk drives (8) (upgrading to 3380 in 3 months), 3420 Model 8 tape drives (3), 4245 printer (1), 1419 reader/sorter (1), 3705 Telecommunications Controller (1).

Leasing: 3191-A10,-D10 Administrative Terminals (53 in total).

Software Products: $0.1M

- Systems Software

  VSE/SP operating system, VSAM, CICS, Computer Associates Sort, DYNAMT/D/F1, EARL, Westinghouse Disk Utility System.

Professional Services: $1.6M

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services -	P	Project Management -	P
Design/Integration -	P	Education/Training -	P

Software Development

Developing custom software for all banking functions, including: combined statement, ATM and on-line teller machine, demand deposit, savings, CDs, IRAs, installment loans, commercial loans, general ledger, ATM cards, and asset-liability information.

Operations and Maintenance: $1.0M

- Perform daily operation functions and supply software maintenance.
- Install all regulatory changes and ongoing production software.

Project Status

Conversion completed 9/87. Ongoing contract for facilities management until 5/92.

APPLICATIONS INTEGRATION EXAMPLE #2

SYSTEMS INTEGRATION
PROJECT REPORT

PROCESS MANUFACTURING

Code: VII-011
Date: 12/88
Project: CIM

Customer: Manufacturer

Business Problem

A corrugated packaging manufacturer needed to integrate its factory floor operations with its business systems. The decision was made to upgrade one plant as a pilot site; if successful, the system will be transferred to the company's 25 other sites.

Major Tasks

- Convert existing System/36 software to new system.
- Network the business operations, the plant floor, and headquarters.
- Develop and implement CIM and business applications software.

Contract Information

TYPE	AMOUNT	DURATION
Various	25.0 ($M)	60 (Mo)

Schedule

FEASIBILITY	RFP RELEASE	BID DUE	AWARD	COMPLETION
1985	9/87	12/87	1Q 1988	1993

Contractor

	COMPANY	FUNCTION
Prime Contractor	Digital Equipment Corp.	
Subcontractor	Allen-Bradley	CIM software products
Outside Consultant		

Project Components

Equipment

DEC VAX 3600 (1), DEC MicroVAX II (2) in Myrna environment, DEC graphics and color terminals (70), IBM PC/AT/XT, numeric code devices, PLC, bar code readers (41)

Software Products

- Systems Software

  DECnet, Ethernet, "C," DEC proprietary Basestar

Professional Services

P - Prime Contractor; S - Subcontractor; O - Other			
Consulting Services -	P	Project Management -	P
Design/Integration -	P	Education/Training -	P

Software Development

All shop floor functions, as well as some additional office functions, including cutting and printing die tracking, and customer complaint history.

Project Status

The pilot site is in the implementation stage. If successful, this pilot will be the model for future upgrades to the company's 25 other factories, scheduled to be completed within the next four to five years. The current plan is to transfer and modify the pilot site software and procure the necessary hardware for the other sites.